RAILROAD GAZETTE

FRIDAY, JUNE 4.

Changing Gauge on the East Tennessee, Virginia & Georgia.

Mr. F. K. Huger, Superintendent of the East Tennessee Division and branches, East Tennessee, Virginia & Georgia recently issued elaborate instructions for the change of gauge of that road from 5 ft. to 4 ft. 9 in., which are given below, omitting only the list of foremen and the sections to which they are assigned. These orders were unavoidably orowded out last week, but we publish them now, to show how the change was made on an important road :

1. On Wednesday, May 26, the gauge of the track of the North Carolina Division will be changed from 5 ft. to 4 ft. 9 in. by moving the north rail, or the rail on the right-hand side going to Morristown, 3 in. inward.

2. On Monday, May 31, the gauge of the track of the K. & O. Railroad (except Jellico Yard) will be changed as above by moving the south rail, or the rail on the right-hand side going to Knoxville, 3 in. inward.

3. On Sunday, May 30, that portion of the yard at Jellico lying in the state of Tennessee will be changed in same manner as above, and at same time as L. & N. Railroad.

4. On Monday, May 31, the gauge between Ooltewah Junction and Cohutta, Ga., will be changed as above after No. 12 passes by moving the north rail, or the rail on the right-hand side going to Ooltewah Junction, 3 in. inward.

5. On Monday, May 3, the gauge will be changed between W. & A. Junction and Cleveland, Tennessee, *after No. 2 passes*, by moving the north rail, or the rail on the right-hand side going to Chattanooga, 3 in. inward.

6. On Monday, May 31, Chattanooga Yard will be changed *after dep arture No. 2.*

7. On Tuesday, June 1, the gauge between Bristol and Cleveland, Tennessee, will be changed by moving the north rail or rail on right-hand side going to Chattanooga 3 in. inward.

8. The north or south rail, as indicated above, will be moved in 3 in., except at sharp curves where expansion makes it impracticable. In this case, when approaching the curve on the outside rail, continue the 3 in. gauge to the first joint on curve; the next, or second joint on curve, to be set in 2½ in.; the third, 2 in.; the fourth, 1½ in.; the fifth, 1 in.; the sixth, ½ in., until you reach the seventh or last joint, which is not to be changed. The rail on *inside of curve opposite the seventh joint* will be moved in just 3 in.; opposite the sixth joint, move in 2½ in.; opposite the fifth joint, 2 in.; fourth joint, 1½ in.; third joint, 1 in.; second joint, ½ in., back to opposite the first joint, where the inside rail will not be moved. Then continue from opposite the seventh joint with your 3 in. change on inside of curve. In leaving the curve on the inside to cross over, this operation will be reversed; rails to be moved as indicated by gauge spikes previously set.

9. Messages referring to change of gauge will have precedence over all other business. Operators at all telegraph offices will be on duty at 3.30 a. m. sharp, on day of change of gauge, and report to the Master of Trains. They will have their meals brought to them, remain on duty until relieved, and report promptly the progress of the work.

10. All trains (except designated work trains) will be abandoned at 3 a. m. on day of change, and they will not be allowed outside of switches after that hour, unless moved by order of the Master of Trains or Superintendent.

11. At 3.30 a. m. all work trains, section gangs and other roadway forces will be in their proper places, fully equipped, and they will, at 4 a. m. sharp, or sooner if ready (but not before 3:30 a. m.), commence the work of changing gauge, and they will continue working in the direction assigned them until they meet the force working from the opposite direction, when they will at once return over their own sections, full spiking curves, if possible, and completing any unfinished work.

12. At junction and terminal points, the Roadmaster may change such tracks as are not needed any time between May 20 and day of change. At way stations between Bristol and Chattanooga where side track is long enough for half of it to hold trains to meet and pass, the east half may be changed between May 25 and day of change. In this case, a cross-tie must be secured across centre of siding, and switch at end of siding so changed must be spiked down until day of change. On day following day of change, the other half of siding (west end) must be changed along with other side-tracks if any left unchanged, which, however, should be avoided if possible.

13. It will be the duty of the Roadmaster to see that every necessary preparation is made on or before May 25, as follows: *All switches* prepared for change, as per plans furnished; stub and split switches with adjustable tie bars, and Wharton switches with necessary castings and bolts: All *switch stands* on the side to be changed, to be so arranged that they can be readily and promptly moved inward the required distance: Head-blocks to be gained necessary width and depth and all required holes bored: All ties to be adzed where necessary at least 5 in. inside of frogs and rail to be moved, and ballast leveled off for same distance, especially at road crossings. Draw all inside spikes on tangents, except joints, quarters, and two centre spikes, and every other inside spike on curves. Draw every other outside spike on both tangents and curves, except joint spikes. Straighten all spikes as drawn and place on ends of ties, except that inside spikes as drawn, after being straightened, will be set in same tie by gauge plates furnished for this purpose, 3 in. inside of base of rail to be moved (except on curves as otherwise provided for) and be driven straight and accurately to within one inch of top of tie from underside of spike head. All *broken spikes* to be replaced with new spikes, and 6 additional new spikes per rail to be distributed. On day of change a spike must be driven in every other tie on outside of curves and tangents, and the gauge spikes on inside *previously set must be driven down snug to the rail.* Spikes will not be removed from rail braces previous to the throwing in of the rail. All inside spikes will be removed from slots in joints of angle bars, and be redriven outside of slots in the same tie, to facilitate the drawing of spikes on day of change.

14. On May 24, each section-master will go over his track and see that all spikes have been drawn as provided for, gauge spikes properly set and driven, *especially* on curves, and new spikes distributed. He will examine all switches in person, drop a little oil on threads where bolts are to be moved, and correct any discrepancy that may exist.

15. Section gangs will consist of three men to the mile in addition to the foreman, and they will be increased to this number on May 27, if practicable, but which number must not be exceeded. *Each gang will supply itself with cooked rations for the day.* Work train forces will consist of conductor and 20 men.

16. Section-masters will report by wire at first telegraph office reached on day of change of gauge, progress and completion of work to the Superintendent at Knoxville.

17. All work on main track to be finished on day of change, if practicable, curves to be fully spiked, and sidings narrowed, except that sidings and tangents may be half spiked if found necessary, and finished following day.

18. The pay of section foremen on day of change will be $2, and of section hands, regular and extra, $1.50 per day. Checks for wages of section hands (provided for this purpose) to be countersigned and issued by the section-master on completion of the work, and be paid by the nearest Agent on presentation of same, the time of regular and extra hands so paid off to be docked from the company's time book on that date. The time of section-masters will appear on regular check roll, as usual. Conductors in charge of work trains, foremen in charge of extra gangs, and others engaged in the work of changing gauge not otherwise provided for will receive 50 cents for that day's service in addition to their regular pay, same to be entered on check roll, as usual.

19. Each Supervisor will go over his division on lever car between the 25th and 28th insts. accompanied by section-foremen over their respective sections, and see personally that everything is in readiness for the change, and that section-masters are properly instructed and fully understand what is required of them. They will on completion of this inspection trip report fully in writing to the Roadmaster, who will forward same to the Superintendent not later than Sunday, May 30.

20. Section-masters will be expected and required to ask for any information touching any part of these instructions which they do not fully understand, that they may be fully prepared for the work on the day of change.

21. Supe visors will see that each regular section-master has on hand not later than May 25 the following tools, which must be in good order and ready for use at the place designated at 3:30 a. m. on the day fixed for change of gauge, and the Supervisor will take from each section-master a receipt for such tools, and send same to the Roadmaster for his information.

TOOLS FOR EACH GANG OF 18 MEN.

Push car, 4 ft. 9 in. gauge	1
Track gauges, 4 ft. 9 in	2
Spike mauls	10
Spike maul handles (extra)	10
Claw bars	6
Lining bars	3
Cant hooks	2
Track wrench	1
Monkey wrench	1
Adze	1
Axe	1
Cleavers	2
Shovels	2
Spikes (kegs) day of change	4
Tape line	1
Water bucket and dipper, each	1

22. The following organization, per section, based on three men per mile, will be adopted, but may be changed as the work progresses, if deemed advisable, the number of men, 3 per mile, however, not to be exceeded.

Men drawing inside spikes	5
Men driving spikes	9
Men throwing rail	4
Men (extra) pushing dump and carrying water.	2
Total	20

* * * * * * * *

In view of the magnitude and importance of this work. I desire to impress on all employés of the East Tennessee Division that very unusual energy must be employed to make the change promptly and successfully, and it is intrusted to them with confidence in their zeal and loyalty to the company's interest.

Improved Railroad Car Seats.

[A PAPER BY MR. M. N. FORNEY.]

The aboriginal idea of the relation of a seat to the person who occupies it undoubtedly was that an individual who sits down should adapt himself to the form and character of the object he sits on. The savage who rested his weary body on the trunk of a fallen tree, or on a rock, probably entertained no thought of shaping either of them to the form of his body. He accepted them both as inevitably uncomfortable, and squirmed into the least painful position he could assume while he rested on them. The early car-builders seem to have entertained a similar idea regarding the seats they furnished to the traveling public that the savage did with reference to the rocks and the trees of his native forest. If you complained that the backs of the seats were uncomfortable, the car-builders were disposed to answer that the discomfort was due to some defect in the occupant, and not in the back of the seat; and if passengers wriggled about into every conceivable position, in their efforts to find the least uncomfortable one, the cause was attributed to the ill nature of the passenger, instead of to the wrong proportions of the seat.

The purpose of this paper is to set forth some of the conditions which must be fulfilled in order to make a seat comfortable, and next to call attention to a seat which has been designed for railroad cars in accordance with these requirements.

First, then, it may be said that it is essential for comfort that a seat should have ample bearing surface for the body If the point of a pencil is pressed on the back of the hand it requires a very slight amount of force to make the pressure painful. If the opposite end of the pencil is pressed with an equal amount of force there is no pain—the reason being simply that in the one case the bearing surface of the point is very small, and the pressure per square inch—or the intensity of the pressure—is therefore very considerable. When the same pressure is distributed over the larger area of the opposite end of the pencil, it has more bearing surface on the skin, and there is, consequently, not so much force concentrated on a small area. Most persons have experienced the truth of this proposition while sitting on the sharp edge of a fence rail, and know how much more comfortable it is to be on the fence when the flat side of the rail is turned upward. The difference is due simply to the greater bearing surface of the body on the rail, when in contact with the flat side, compared with that which rests on the sharp edge.

The action of journal bearings is governed by the same principle. If a heavy load is placed on a journal, the pressure per square inch is intensified, with the result that the lubricant is liable to be pressed out, and the journal and bearing abraded. Increase the area of the surfaces in contact, and you will have less intensity of pressure, and not so much liability of abrasion. What we should aim at, then, both in journals and in car-seats, is to give as much bearing surface as possible. One reason why lying down is so much more restful than sitting is that in a prostrate position a larger portion of the body is in contact with its support, and consequently there is less pressure per square inch on the surfaces in contact. It should not be supposed either that it is only a degree of pressure which is *painful* that causes discomfort. Every one knows the relief which follows a change after occupying one position a considerable time. Under such circumstances, what at first seems a very gentle pressure on the body becomes uncomfortable after being long continued.

The general principle may be stated that the less the intensity or amount of pressure per square inch on the body the longer it can be endured without discomfort. For this reason it is desirable that the weight of the body should rest on as large a surface as possible, and that it should be uniformly distributed on this surface, so that the pressure at one point may not be greater than another. All know the discomfort which results from sitting or lying on a hard, flat surface. The reason is that the prominences only of the body come in contact with such a surface, and therefore the person's weight is supported by a comparatively small area, and the pressure is more or less intense on those prominences. If the object on which the body rests is soft and elastic, like a cushioned seat or mattress, then its surface is depressed by the prominences of the body, and there is less intensity of pressure on one or a few places than there would be if there were no "give" to the support. But elasticity and softness are not alone sufficient to make a seat entirely comfortable, because when two elastic surfaces are of different forms, one being, say, convex and the other flat, if they bear against each other they are each compressed most at the points which first touch. This can be illustrated by an elastic India rubber ball. If you press it on a flat surface the portion that is compressed most is that which first comes in contact with the surface. The form of the area of compression is circular, the centre of which is compressed most, and from the centre the intensity of pressure diminishes in a manner analagous to the way in which a circular ripple is reduced as it extends from the point at which a stone is dropped into a pond of water. The inequality of compression is still greater if two elastic convex bodies are pressed against each other, as in the case of two india rubber balls. If, however, one of the balls rested in a concave receptacle, as an acorn fits into its cup, then, obviously, the pressure on the whole surface of the ball in contact with the cup would be uniform, or very nearly so, and each part would be compressed equally.

Now, what do we ordinarily find to be the shape of car-seats, and, in fact, the shape of seats of nearly all stuffed chairs, sofas, etc.? Is it not the case that upholsterers seem to aim to make stuffed, and especially spring seats, as *convex* as possible? When that is the case then we have the condition of things illustrated by the two India rubber balls; that is, we have two convex surfaces in contact, with the effect, as in the India rubber balls, that there is an unequal compression of the seat and of the body supported by it. The discomfort which results from this condition of things is manifested by the uneasy movements and wriggling of the occupants of such seats, which can be so often observed in passenger, and especially drawing-room cars. It is true, too, that the evil is increased in the case of car seats by the necessity of making the springs in them very stiff to resist the jolting action of the cars.

The cure of the evil is suggested, however, by the india rubber ball and the cup, or by what most of us have learned of the comfort of a shoemaker's bench, with a concave leather seat. The shoemaker who must occupy his seat many hours in the day has learned the comfort which results from ample bearing surface, and has also learned what the acorn should have taught upholsterers, that a convex object fits much more comfortably into a concave receptacle than it does in contact with a surface of similar contour to its own. But besides being concave, seats should have an ample amount of width measured from the back to the front edge. This increases the bearing surface, and gives support to the body just above the knees, where support is much needed, and where it adds materially to the comfort of the person occupying the seat. Care must be taken though, not, to have the seat so high that the weight of the person will rest on its front edge, because then the circulation in the veins and arteries will be obstructed, and will cause discomfort. If the seat is low the pressure on its front edge can be relieved by changing the position of the feet. A width of about 18 in. has been found to give the maximum of comfort to the average sized passenger. When car seats are spaced closer together than 36 in. it is difficult to make them as wide as 18 in., and for this reason, if the greatest amount of comfort is aimed at, it is well to space car-seats wider apart than the usual distance of 33 to 35 in.

There is another fact which has an important bearing on our comfort which is often forgotten; that is, that a certain amount of muscular exertion is required to maintain an erect position while either sitting or standing. That such is the case is shown when a man is struck a sudden blow, faints away, gets very sleepy or very drunk, and his muscles are relaxed, he "falls into a heap." Ordinarily when we are awake and sober we make this exertion unconsciously; but that it is fatiguing is shown by the sense of relief which comes when we can lean against an object or lie down. The more, therefore, that we can diminish the muscular effort to sit erect the less will be the fatigue and the greater the com-

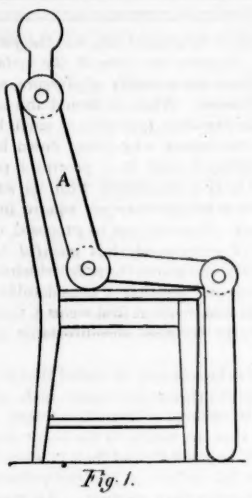


Fig. 1.

fort. Now, in order to show the kind of exertion required to sit erect in ordinary seats, let it be supposed that instead of supporting a human being, composed of flesh and blood, bones, joints and prejudices, let us imagine that we have a wooden structure, *A*, fig. 1, jointed somewhat as a man is, and that we place him on a seat and subject it and our wooden man to a jolting journey over an average railroad. The trunk *A* of the artificial human being is placed in an inclined position against the back of the seat, very much as a passenger in a railroad car would sit. The seat is either flat or convex. Obviously, in this inclined position of the trunk, the jolting would have a tendency to move the lower end of the wooden figure forward, or away from the

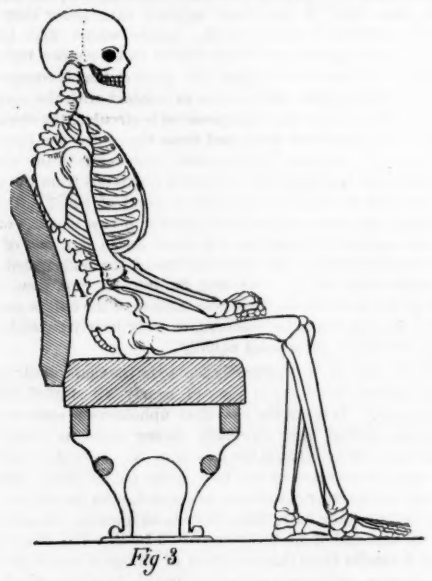


Fig. 3.

back of the seat, and unless restrained it would slip off. Now, exactly this effect occurs with passengers when they sit on a flat or horizontal seat. They resist the tendency to slide forward by more or less muscular effort and an occasional "hitch" backward to regain their original position. This in time becomes fatiguing. Supposing, though, instead of being horizontal, that the seat is inclined backward, as shown in fig. 2, so that its top surface is at right angles to the centre line of the trunk of our wooden structure, then it is apparent that the inclination of the seat would resist the tendency to slide forward, and that, if the inanimate object was endued with life, no muscular effort would be needed to avoid sliding away from the back. The manufacturers of the old-fashioned stage-coaches learned by experience that the violent jolting of these vehicles had the effect of causing passengers to slide forward, and that continued effort had to be made to resist

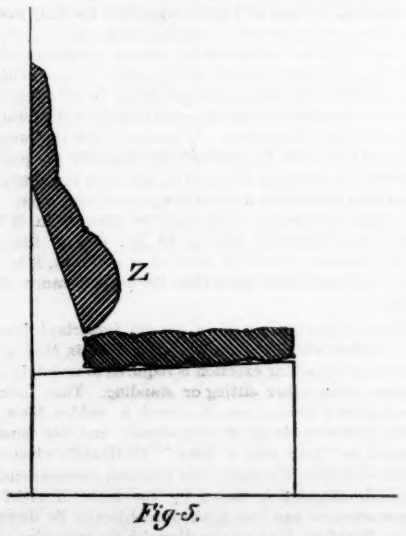


Fig. 5.

this. They therefore inclined the seat so that the tendency was to slide backward instead of forward. There is the same reason for giving a backward inclination to car-seats.

Professor Huxley, in his elementary book on physiology, says: "The upright position, easy as it seems, is the result of the contraction of a multitude of muscles which oppose and balance one another." He was then referring to a standing position, but his remark is also true of an upright sitting. The portions of the body which then require the most exertion to keep erect are the neck and loins, for the reason that in these the only bony supports consist of the cervical and the lumbar vertebræ. These are each articulated columns consisting of a number of superimposed bones, which are adapted to move or turn one upon the other, and are liable to lateral flexure unless restrained by muscular effort. The head being a heavy object requires considerable effort to keep it balanced, and consequently any support for it or for the neck is conducive to rest and comfort.

Again, if the body is required to remain in a sitting posture for any great length of time, a support for the back in the lumbar region will afford relief to the muscles, which, without such support, would be more or less exerted to keep the vertebræ erect.

A writer in *Science et Nature* says: "In a sitting posture, the pelvis has for its sole function the support of the upper part of the body. The spinal column, however, is inserted in the pelvis, not in the form of a straight line, but of a curve, fig. 3. This inflection on the part of the backbone, while adding to the mobility of the trunk, imposes on it the necessity of a continual balancing movement, the centre of gravity being shifted every time the head and thorax sway to one side or the other. Such balancing movement is necessarily also attended by a certain expenditure of energy. To allow the upper part of the body to remain comfortably at rest, there must be supports for the back, the shoulders and the head. So far as these are wanting, the body will tend of itself, unless counteracted by an effort of will and nervous force, to bend forward."

In sitting in an ordinary car-seat, fig. 4, the shoulder blades alone are in contact with the back of the seat. The lumbar region of the back does not ordinarily touch, nor is it supported by the seat-back. If a person places himself in a position so that this part of his body is in contact with the seat-back, his chest is thrown forward, and it and his stomach and other organs are compressed in a manner which is both uncomfortable and unwholesome. On almost any ordinary chair, if a projection or support is placed behind the "small of the back," at *B*, fig. 4, it will afford a very grateful support, and will add very much to the comfort of the occupant of the seat.

The backs of English railroad seats, especially in the first and second-class carriages, are all made with projections, as shown at *z* in fig. 5, which are upholstered with soft springs and an abundance of curled hair, which is placed in just the right position to support the back where it most needs support. A similar form of back has also been adopted recently for chairs in drawing-room cars in this country. Fig. 6 represents a section of one of the arm-chairs in the reading-room of the Union League Club, New York. These may be taken as models in designing a seat intended to give as much comfort as possible to the person who sits in it. The seats in those chairs, while they are not made concave, are upholstered with very flexible springs, so that they assume that form under the weight of an occupant. Car-seats cannot be made equally soft, owing to the jolting of the cars, and for that reason they are more comfortable if their original form is made concave.

The advantages of the form of the back described being recognized, its use suggested itself for ordinary reversible car seats. In other words, it was apparent that if the back of either the English seat or the chair, shown in fig 6, could be transferred from the position in which it is represented to the opposite side of the seat, as shown in dotted lines in fig. 6, a seat with a reversible back could thus be made as comfortable as the chair. The difficulty was to provide mechanism by which a back of this form could be reversed from the one position to the other. When an ordinary reversible car-seat back is turned over, what is the upper edge on one side becomes the lower edge on the other. The chair-back has a projection, *A*, to support the lumbar region, and another, *B*, for the head and neck. If the back is turned upside down when it is reversed from one side to the other, then obviously what is the upper projection on one side will become the lower one on the other, and they must act alternately as supports for the head and the back. A very little modification of the forms of these projections, as shown in figs. 7–10, was all that was needed to adapt them to this alternate use. The modified form of back was then laid down, as shown by dotted lines in fig. 7, on each side of the seat in the position which would be most conducive to the comfort of an occupant of it.

The problem which then presented itself was to provide mechanism for effecting the reversal of the back from one of its positions to the other. It was impracticable to use the ordinary seat-arms and pivots, because the transfer of the back from the one position, in which it is represented, to the other, would make it essential to place the pivots and the seat-back arms at a height above the seat which would be quite inadmissible.

To meet this difficulty the expedient of the crossed links or arms *L L'* at each end of the seat was adopted. These are connected to the seat-end by fixed pivots at *P P'*, and to the seat-back by other pivots *p p'*. The links project below the fixed pivots *P P'*, and each of them has a projecting pin or stud *S S'* (shown in a front view of one of the links at *A*, fig. 7), which supports the seat. The seat or cushion-frame has slots *s s'* in each end which receive the pins *S S'*. These slots

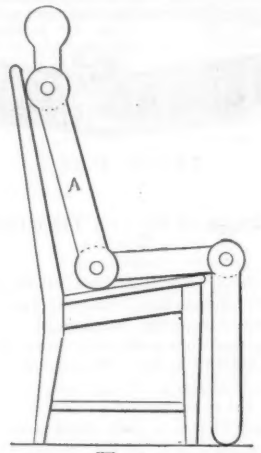


Fig. 2.

allow for the variation in the distance apart of the pins, which occurs when the back is reversed. The action of these links will be readily understood if we follow the movement of the back from the position shown by dotted lines at *B*, fig. 7, which is the same as that in which it is represented in figs. 8 and 9, to the position when it is turned half-way over, represented in full lines in fig. 7, and finally to that indicated by dotted lines at *O'*, when the back is completely reversed. The dotted lines *o p q* and *o' p' q'* represent the paths in which the upper pivots move when the back is reversed, and *r s t*, *r' s' t'* are the paths which the lower pins or studs describe during the same period. The seat *M* in fig. 7 is represented in one posi

Fig. 4.

tion only—that which it occupies when the back is half-way turned over; but in figs. 8 and 10 it is represented in its reversed position.

These illustrations show that the reversal of a seat-back of the form and proportion described is effected in a very perfect manner by means of the crossed links, and by connecting them to the seat, as described, the latter is moved horizontally and its inclination is changed simultaneously with the reversal of the back. If the seat is not moved horizontally when the back is reversed, more room lengthwise of the car will be required for each seat of a given width, and a back of any desired form or inclination. With this mechanism for reversing the backs they can be made of any required height, and, as appears from the illustrations, their lower edges come above the tops of the seats. Therefore, although they are of ample height, their width need not be any greater than that of those ordinarily used. It will be seen, too, that the space at *F*, fig. 8, behind the seat, is entirely clear, so that with seats of this kind there is more room than with those ordinarily used. This is shown clearly in the perspective view, fig. 11. The difference in this respect is very marked, if the comparison is made with seats which have wide backs like those adopted on the Pennsylvania Railroad.

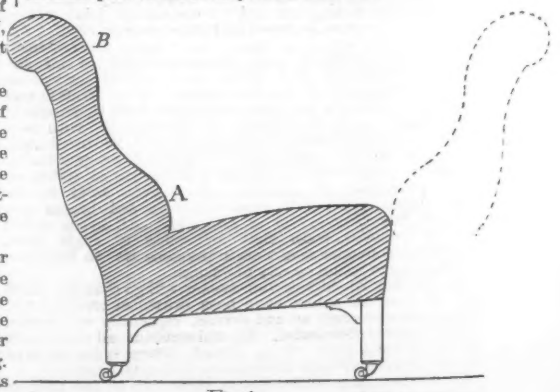


Fig. 6.

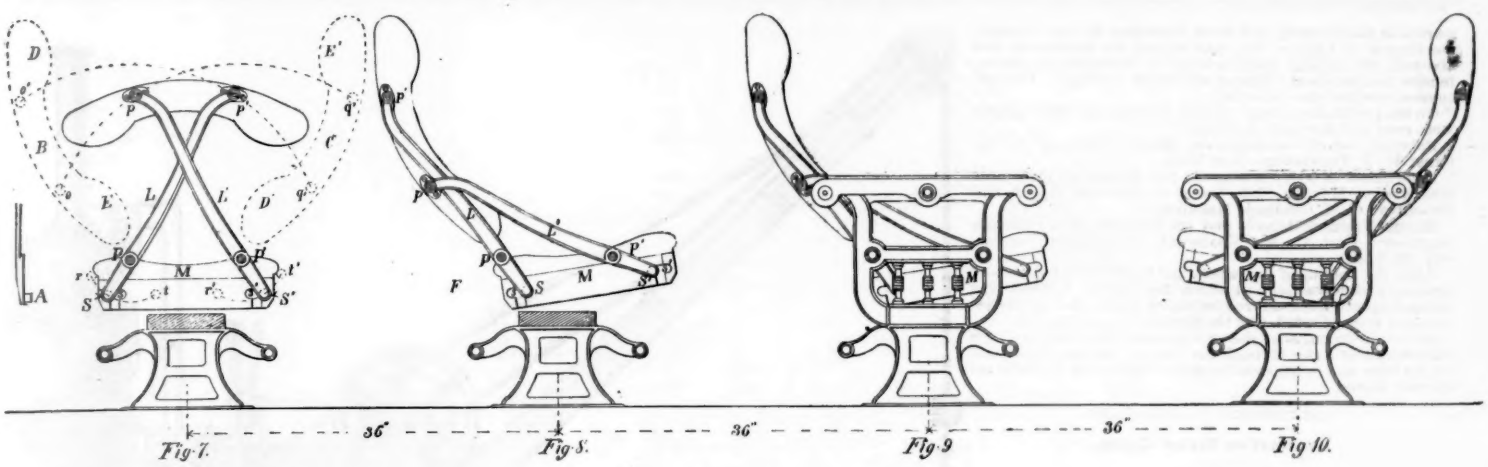


Fig. 7. Fig. 8. Fig. 9 Fig 10.

The fixed pivots *P P'* attached to the seat-ends are as low down as the top of the seat. Consequently the seat-arm and the window-sills need not be made any higher than is consistent with comfort. Usually they are so much above the seat that when the arms of passengers rest on them their shoulders are raised up into an uneasy position. If such window-sills and seat-arms were lowered from 2 to 6 in., they would be much more restful to occupants of the seats. This is one reason why some prefer the drawing-room car chairs to the common reversible seats.

The chief reason, though, for the preference for drawing-room cars and chairs is their exclusiveness; that is, passengers secure a seat to themselves. The chairs are, however, limited in size, and do not allow of much change of position to those who occupy them. The improved seat described in the preceding part of this paper has all the elements of comfort that a drawing-room car chair has, and besides, it has double the width. These seats occupy no more space longitudinally in car than a chair does (not so much as some do), and therefore as many of these double seats as chairs can be put into a car, and consequently a railroad company can afford to sell the double seat at the same price as is charged for chairs.

In drawing-room cars the double seats might be substituted for the single chairs, the new seats being sold at the price now charged for a single seat. It is not proposed to diminish the exclusiveness of drawing-room cars, but to supply double seats instead of single chairs, and then sell the right to one or two persons to occupy them. If occupied by one person, it would give sufficient room to enable him to change his position to a much greater extent than is possible in a chair, and it also gives space enough to hold his books and parcels. If two persons agree to occupy a seat together, they could travel at half the present cost.

Railroad and drawing-room car managers may object to charging the same price for a double seat that they are accustomed to charge for a chair, but the double seats do not occupy more room than the chairs, and it seems probable that the revenue derived from the sale of seats in such cars would be increased, as travel is cheapened, made more comfortable, and its cost to the railroad not increased.

Mr. R. A. Proctor, the well-known English astronomer, after traveling quite extensively in this country on a lecturing tour a few years ago, wrote of our cars that "you generally travel in much more real privacy and comfort than in an English first-class carriage not secured by a lawless fee to the guard. I used to find quite a rest in my little two-seat compartment to myself, all the passengers sitting in similar compartments facing one way; I could read or reflect undisturbed. Who can say quite as much of an English first-class carriage, if there are two or three passengers in the opposite seats. It is true that part of this arises from the 'stony British stare' which foreigners and Americans find so strange and so unpleasant. But 'fix it how you will,' you can never feel quite so much at ease facing several persons as when all face the same way. On one very special occasion, in America, when I had to travel in an ordinary car for several hours, under circumstances which would make staring excusable enough (not to make a mystery when there need be none, I was one of a wedding party of two), I was struck with the careful courtesy with which a two-seat compartment seemed to be regarded as if it were a private sitting-room. I never more thoroughly recognized the innate courtesy of all Americans toward ladies than I did on that occasion. Of course, when traveling in an American car a man may be addressed by a fellow-passenger more freely than in England, but it is easy to answer pleasantly, and, if the conversation wearies either, to close it or seek another place."

In drawing-room cars much of the exclusiveness that Mr. Proctor speaks of is lost, especially where the wide windows are used, which require that every alternate passenger must ride backward to look out the window. Revolving chairs always create a liability of trespass by neighboring passengers on each other's territory, which to ladies is often unpleasant, not to use a stronger term. Double seats with reversible backs also have the advantage that they allow passengers to sit much nearer to the windows than is possible in revolving chairs. Consequently, the person in the seat has a much wider range of vision when looking out of the window than he has when sitting in a chair, which must be placed some distance from the side of the car, so as to have room to turn.

Fig. 11 is a perspective view of two seats, one with an iron and the other with a wooden end. These show the form of the seats and backs, and also the space which they give to a passenger. Seats of this kind are in use on the New York & New England, the Long Island, and the New York Central & Hudson River railroads. The plan has been patented by the writer, who will be happy to answer any inquiries addressed to him at No. 71 Broadway, New York.

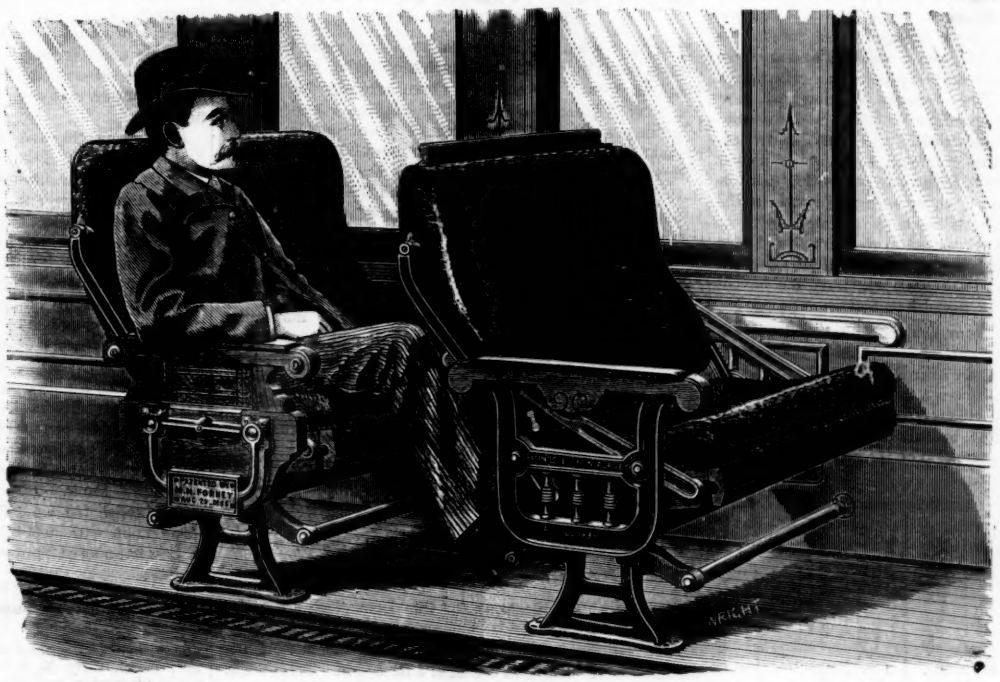


Fig. 11.

M. N. FORNEY'S IMPROVED CAR SEAT.

The Spring Meeting of the American Society of Mechanical Engineers.

The spring meeting of the American Society of Mechanical Engineers began at the Grand Pacific Hotel, in Chicago, on Tuesday, May 25, with a large attendance. At the opening meeting the usual addresses of welcome were made, Mr. Henry R. Towne presiding, in the absence of the President, Mr. Coleman Sellers, of Philadelphia, who was detained at home by illness. After the opening session an informal reception was given the members and guests, which was much enjoyed. A large number of members were accompanied by their wives.

On the second day two sessions were held, which were devoted entirely to the reading of papers, a large number of which were presented. The papers read were:

Substitutes for Steam: George H. Babcock, New York.

A Novel Chimney Staging: F. G. Coggin, Lake Linden, Mich. This was a description of the novel methods employed in building up a wrought-iron chimney 165 ft. high and 13½ ft. in diameter for the Calumet & Hecla Mining Co. at Lake Linden.

The Relative Efficiency of Centrifugal and Reciprocating Pumps: William O. Webber, Lawrence, Mass.

Experiments on the Transmission of Power by Belting: Wilfred Lewis, Philadelphia.

Another New Steam Engine Indicator: Charles W. Barnaby, Salem, O.

The Shop-Order System of Accounts: Captain Henry Metcalfe, Watervliet Arsenal, Troy, N. Y.

The Relative Value of Water Gas and Gas for the Siemens Reducer: F. W. Taylor, Philadelphia.

Inventory Value of Machinery Plant: Oberlin Smith, Bridgeton, N. J.

The Engineer as an Economist: Henry R. Towne, Stamford, Conn. This paper was an argument in favor of the addition of a new section for the Society called the Economic Section.

The Contraction of Duplicate Castings: Thomas D. West.

The Purification of Water for Domestic and Manufacturing Purposes: Thomas S. Crane, Newark, N. J.

Handling Grain in California: John H. Cooper, Philadelphia.

In the evening the annual dinner of the Society was given at the Grand Pacific Hotel, with the usual accompaniments of addresses, speeches, etc.

The third day was devoted to an excursion tendered the visiting members by the resident members and the Western Society of Engineers. The members and invited guests

started in the morning on a train furnished by the Chicago, Burlington & Quincy Co., and visited the stockyards and abattoir, the various manufactories at Pullman and the extensive iron works at Calumet and South Chicago. This excursion occupied the entire day.

On the fourth day a single session was held, at which papers were read and discussed as follows:

Relative Cost of Ventilation by Heated Chimneys and by Fans: W. P. Trowbridge, New York.

Description of a Dynamometer for Measuring the Power Required to Move a Slide Valve at Different Speeds and Pressures: C. M. Giddings, Massillon, O.

Manual Training Schools and the Training of a Dynamic Engineer: Prof. C. M. Woodward, Washington University, St. Louis.

After the reading of the papers had been concluded a short business session was held, at which the routine business was finished up and the usual resolutions of thanks for courtesies received were adopted, and the Society then adjourned.

In the afternoon, after the adjournment, the members were entertained by a ride through the city in carriages and a sail on the lake, and in the evening most of them left for their respective homes.

Locomotive Steam Crane.

The accompanying illustration represents a locomotive steam crane made by the Yale & Towne Manufacturing Co., of Stamford, Conn. The following particulars as to the performance of the crane in one branch of service, clearing rock cuttings, will probably be interesting to many of our readers, especially as we have every reason to believe that these statements have been carefully verified and may be accepted as substantially correct.

During the winter of 1884-85, Mr. Chas. McFadden, Jr., Contractor for Sections No. 125 No. 128 inclusive, on the South Pennsylvania Railroad, finding the work particularly heavy in a rock cut 90 ft. deep, some two miles east of Allegheny Mountain Tunnel, sought economy in working, by the introduction of a locomotive crane, with the interesting result tabulated below.

The rock was exceedingly hard, and in blasting came out in such large blocks, that *prior* to the use of the crane, a great deal of hand drilling and block-holing was necessary to put the material into shape for loading into cars by hand. When the crane was brought into use, the items of hand drilling and dynamite were reduced to a merely nominal cost.

The crane was put in service early in February, 1885, was of two tons capacity, 14 ft. radius, at first of 3 ft. gauge, but soon after being put to work changed to the standard 4 ft. 8½ in. gauge, resulting in greater stability and safety in operating on the necessarily uneven pit tracks. Having its own engines and boiler, all movements, hoisting and rotating, as well as traveling in either direction, were accomplished by power, being very quick, but readily controlled. The Grafton patent rotating gear with which the crane was supplied, proved very useful, frequently preventing possible serious damage to the crane, as in swinging the load the movement was not infrequently suddenly arrested, owing to some obstruction. In the pit, the crane was served and used pretty much as is a steam shovel, and was readily backed out of the way of blasts. Where the crane was used, the face of the pit was 30 ft. high, with a width at bottom of 31 ft.

The following table of percentages shows actual results in the months named, obtained *with* the crane, as compared with work done *without* it, for an average month, from Oct. 1, 1884, to Feb. 1, 1885, in same pit, the other appliances, the foreman and nearly all the labor being the same for the entire period (from Oct 1, 1884, to July 31, 1885). The work was continuous, with the exception of the month of April as noted.

MONTHS, 1885.	Decrease in cost of labor.....	Increase in cost of labor.....	Increase in cubic yards moved.....	Decrease in explosives consumed.....	Decrease in cost of hand drilling.....	Remarks.
	P.c.	P.c.	P.c.	P.c.	P.c.	
February.....	21	.....	2	74	71	
March	14	... .	33⅓	30	70	
April..	.....	.....	.....	.....	.....	Strike.
May...	.....	10⅓	29	20	77	Wages advanced 12½ p. c
June.....	.....	27*	60	12	63	
July.....	05	.. ...	41	24	68	

* A small portion of these items should have been charged to May accounts.

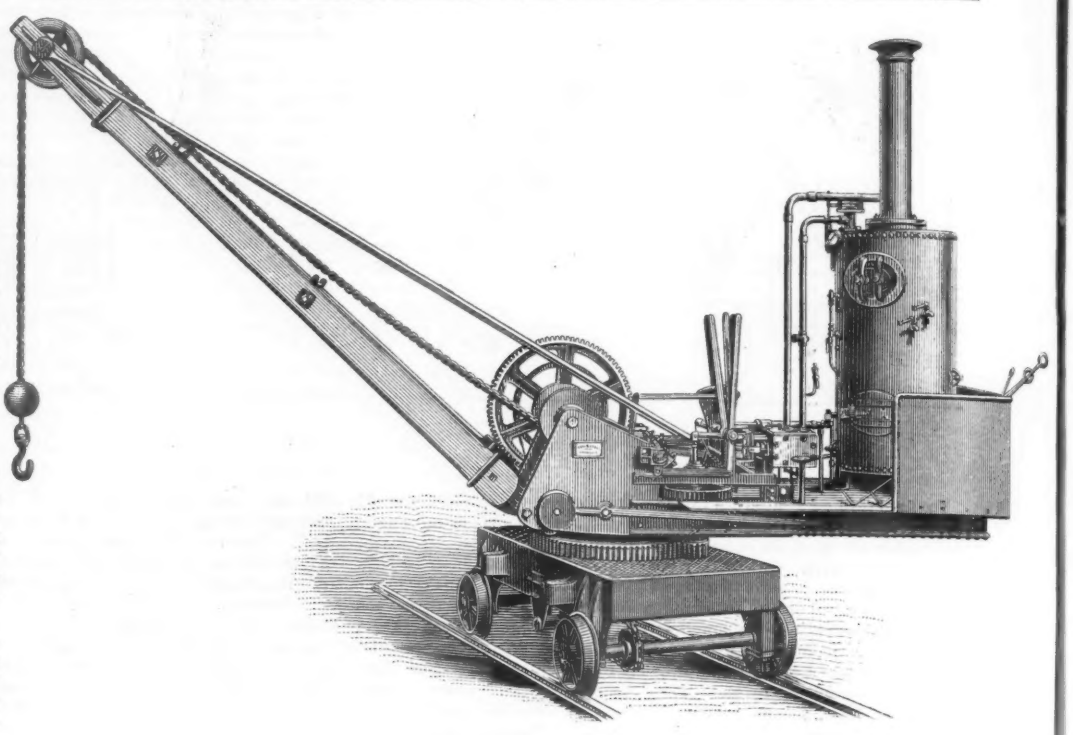
In the above table the cost of fuel, of which the crane is extremely economical, is the only item not considered, because all that was needed was obtained at trifling cost on the work, and all repairs were such that the engineer made them without delay.

The item of steam drilling is not represented in the comparison, because its cost was practically the same for each of the months in the period in question, and was not affected materially by the use of the locomotive crane, unless the more rapid cleaning up of the pit after blasts, somewhat facilitating this class of work, be considered. At one time the crane boiler supplied steam to a 3½-in. Ingersoll rock drill, but did not do any hoisting while so employed.

From the above it will be readily seen how valuable the locomotive crane proved to be for this special work, having, as the contractor stated, paid for itself in less than three months.

Besides the work described, the crane can be utilized on retaining wall work; and with slight alterations for trestle erection, as a steam hoisting engine, as a pile driver engine or as a "clam shell" dredge, so that a contractor is likely to find it a serviceable tool, and keep it steadily employed.

Any further information concerning this style of crane may be obtained of Mr. L. R. Lemoine, 15 North Sixth street, Philadelphia.



LOCOMOTIVE STEAM CRANE.

Made by THE YALE & TOWNE MANUFACTURING CO., *Stamford, Conn.*

Standard Heavy Passenger Engine, Built by the Mason Machine Works.

The illustration represents the standard heavy passenger engine built by the Mason Machine Works, of Taunton, Mass., in 1886. The engine has been carefully designed by Mr. John T. Meats, the Superintendent, who has endeavored to produce a powerful, durable and efficient engine capable of taking a very heavy passenger train at a high speed.

It will be observed from the drawing that the diaphragm in the smoke-box is adjustable, so that the opening at the bottom of the diaphragm for the passage of the products of combustion can be diminished or enlarged at pleasure. The lower part of the diaphragm consists of a plate secured to the upper part by bolts or by pins and cross cotters. The cross cotters can be driven out and the pins replaced in another hole in a few minutes, so that the position of the diaphragm can be easily adjusted to suit any particular kind of fuel or style of firing. In practice, this extension front in combination with a large grate answers very well, the engine emitting few sparks. The cinders drawn into the smoke-box are so few, that with ordinary trains it is unnecessary to empty the smoke-box.

The dome casing and sand-box are plain castings without moldings, simple and graceful curves being alone used. These forms are not only more pleasing to the eye, but are more easily cast and kept clean.

It will be noticed that the bearing and rubbing surfaces are all ample, and considerably in excess of the usual practice.

The general specifications for this locomotive are as follows:

Principal dimensions, cylinders, 18 in. × 24 in.; driving-wheels, 68 in. diameter; gauge, 4 ft. 8½ in. Total wheel-base, 23 ft. 4 in.; driving-wheel base, 9 ft. 0 in. Tractive force, 114 lbs. per lb. average pressure in cylinders.

Heating Surface: Tubes (external), 1,230 sq. ft.; fire-box, 145; total, 1,375 sq. ft. The grate area is 18.9 square feet.

Fuel, bituminous coal.

Weight in working order, total about 100,000 pounds; on driving-wheels about 68,000 pounds.

Boiler, of best Pennsylvania coal-blast charcoal iron, $\frac{7}{16}$ in. thick; form, raised crown with one dome; waist, 54 in. external diameter at smoke-box end; all horizontal seams double riveted and welted, crown sheet flanged into dome and welted.

Tubes, of iron, lapwelded, set in copper ferrules at fire-box end; 212 in number, 2 in. diameter and 11 ft. 2 in. long.

Fire-Box, 78 in. long, 35 in. wide and 75 in. high inside; of best homogeneous steel; side and back sheets $\frac{5}{16}$ in. thick; crown-sheet, $\frac{5}{8}$ in. thick; flue-sheet, ½ in. thick.

Stack, straight.

Grates, rocking and dump.

Frames, forged solid; of best hammered iron, 3¼ in. wide, 4 in. thick. Pedestal caps lugged and bolted to bottom of pedestals.

Cylinders, of best close-grained hard iron; placed horizontally; right and left hand cylinders interchangeable.

Pistons, heads and followers of cast iron, fitted with cast-iron eccentric-ring packing. Piston-rods, of cast steel keyed to cross-heads.

Slides, of best hard charcoal iron.

Cross-heads, of cast steel with cast-iron bearings.

Valve motion, shifting link motion; links, of best iron case hardened; diameter of eccentric-rod pins, 1¼ in.; width of expansion link, 3 in.; length of die-block, 5 in.; stud through die-block, 1⅜ in. diameter; saddle-pin, 1⅝ in. diameter × 5 in. long in bearing; rocker, 4 in. diameter × 10⅜ in. long in bearing.

Driving-axles of best hammered iron. Journals 8 in. diameter and 8 in. long.

Driving-boxes of cast iron, with brass bearings babbited.

Tires of best cast steel, 3 in. thick, both pairs flanged, 5⅝ in. wide.

Rods, connecting and parallel rods, of best hammered iron.

Wrist-pins of best cast steel. Main crank-pin, 5 in. × 4¾ in.; cross-head pin, 3¾ in. × 3½ in.; coupling-rod crank-pins, 4 in. × 4 in.

Springs of best cast steel, tempered in oil.

Truck, four wheels with wrought-iron frame and braces. Steel-tired wheels, 30 in. diameter. Axles of best hammered iron, with journals 5½ in. diameter and 11 in. long.

Cab substantially built of hard wood and well bolted.

Feed-water supplied by two No. 8 Sellers injectors.

Finish: Cylinders cased with iron; steam-chest covered with iron; dome-casing of iron; hand-rails of iron; boiler jacketed with Russia iron, secured by iron bands.

Furniture: Engine to be furnished with sand-box, bell, whistle, shelf for headlight; heater, blower and safety-valves; steam-gauge, gauge-cocks, etc. Also, a complete set of tools, including wrenches to fit all bolts and nuts on engine.

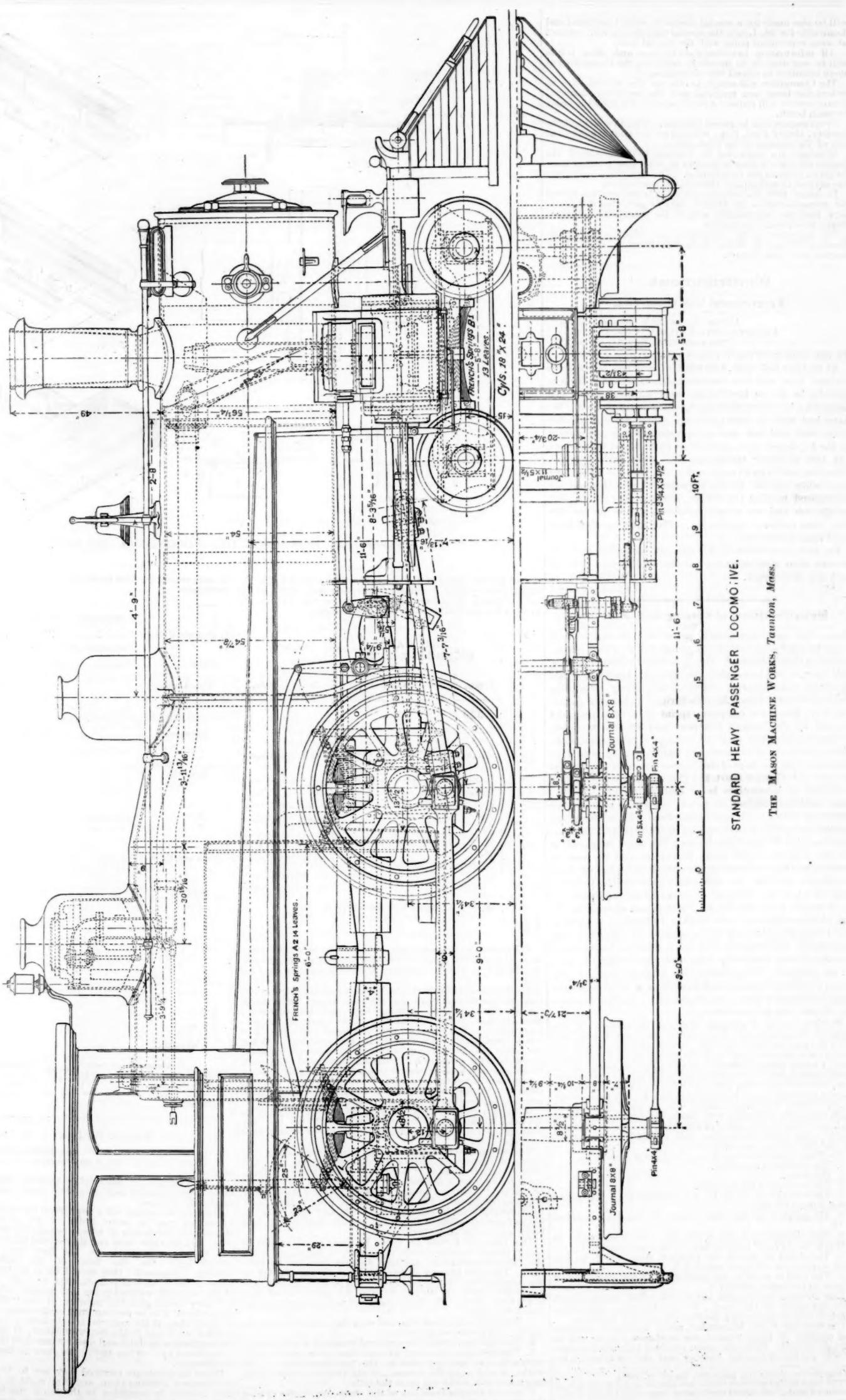
Tender: Tank, 3,600 gallons capacity, carried on two four-wheeled trucks. Frame of iron. Trucks of iron throughout, with steel-wired wheels, 33 in. diameter. Axles of best hammered iron, with journals 3¾ in. diameter and 7 in. long.

American Society of Civil Engineers.

The Annual Convention of this Society will be held at Denver, Colo., July 2, 3 and 5, 1886. Sessions for professional discussion, and one for the transaction of business will be held. After the close of the convention railway excursions will be made to a number of points of engineering interest in Colorado. The details of these excursions will be announced hereafter. They will probably include Greely and the valuable lands reclaimed by irrigation in its vicinity, Georgetown, Leadville, Gunnison and Pueblo. The excursions will probably terminate at Colorado Springs or Manitou, and the party start thence on its return East.

Arrangements have been made with the railroad lines for hauling a train for the transportation from the East of the members of the Society, their ladies, and the few invited guests. It is intended by the Committee to charter for the purpose a sufficient number of sleeping cars to accommodate the whole party. These cars are to be retained for the round trip. This train will start from New York on the New York Central & Hudson River Railroad on Tuesday, June 29, at 10 a. m. sharp, from the Grand Central Depot, and proceed *via* the New York Central & Hudson River and the Lake Shore & Michigan Southern to Chicago; thence to Denver *via* the Chicago, Burlington & Quincy. Members from Philadelphia, Baltimore, Washington and intermediate points can probably best be accommodated by joining this train at New York. Members from Boston join the train at New York or Albany. Arrangements will be made for members from Pittsburgh to join the train at Cleveland. It is not possible to state exactly the cost to each person until sufficient replies to this circular have been received to enable the Committee to determine with some accuracy the number of passengers on the train. If, however, the indications as to this number so far received prove correct, the price will be not far from $60 for the round trip from New York to Denver and return. This will include transportation and one berth in a sleeper. Arrangements are in progress which the Committee think will give satisfaction as to meals to be served on the train. This price will cover the round trip from New York and Albany, and the price will be equitably less from Buffalo, Pittsburgh, Cleveland, Toledo, Cincinnati, Louisville, Chicago and St. Louis.

Should the proposed attendance warrant it, arrangements


STANDARD HEAVY PASSENGER LOCOMOTIVE.
THE MASON MACHINE WORKS, Taunton, Mass.
10 Ft.
Cyls. 18 "x 24"
French's Springs B1 13 Leaves.
French's Springs A2 14 Leaves.
Journal 8x8"
Pin 4x4"
Journal 11x5½"
Pin 3¾x3½"

will be also made for a special sleeper to leave Cincinnati and Louisville for St. Louis; the special cars thence will connect at some convenient point with the special train.

All information practicable as to these and other points will be sent directly to members notifying the Committee of their intention to attend the convention.

The Committee will assign berths on the special cars as orders for them are received, and the necessary financial arrangements will require a remittance of $20 with the order for each berth.

Programmes will be issued directly. The President of the Society, Henry Flad, Esq., will deliver the annual address at one of the sessions of the Convention.

Members are requested to transmit to the Secretary the papers they are willing to present in order that a place may be given them in the programme. The families of members are invited to accompany them to the convention.

In order that the arrangements for transportation to and for accommodation at Denver may be perfected it is necessary that the information sent to the Committee at once. Reply at earliest convenience.

The members of the committee are Messrs. William R Hutton, William H. Wiley, Robert B. Stanton, A. M. Wellington and John Bogart.

Contributions.

Experimental Iron Cross-Ties.

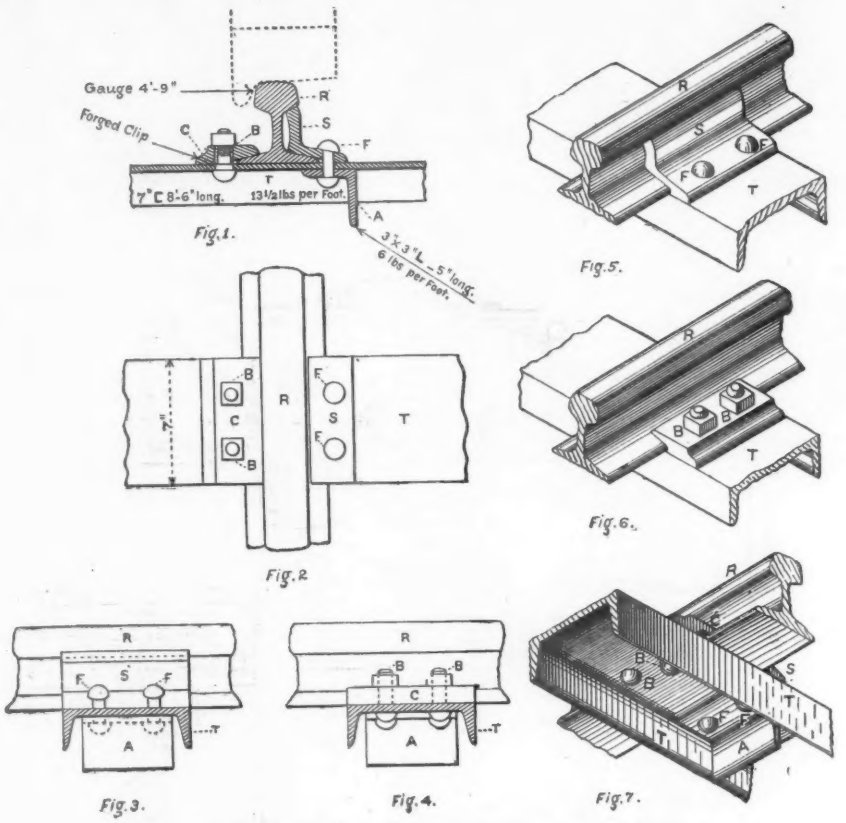
CHIEF ENGINEER'S OFFICE,
PENNSYLVANIA RAILROAD COMPANY,
PHILADELPHIA, May 21, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

As we have had quite a number of inquiries lately from railroad men and iron manufacturers in regard to the iron cross-tie in use on the Pennsylvania Railroad, I send you herewith a blue print showing the character of tie used. We have had some of these ties on our Filbert Street Extension since 1880, and last year we laid about 400 or 500 of them on the 4½ degree curve in the West Philadelphia yard, where 134 fast passenger trains pass over them every 24 hours. These ties cost from $3 to $4 each. As long as we can get good white oak ties for not exceeding $1 each, I would not recommend making the change; although they give perfect satisfaction and are no more trouble to keep in line and surface than ordinary wooden ties. They are somewhat more rigid than wooden ties.

The fastenings shown on this plan are somewhat more expensive than need be, as one bolt can be dispensed with on each side of the track.

WM. H. BROWN,
Chief Engineer.



EXPERIMENTAL IRON CROSS-TIES—PENNSYLVANIA RAILROAD.

Metcalf's System of Keeping Shop Accounts.

Some time ago Capt. Henry Metcalf's work explaining in detail his improved method of keeping shop accounts was reviewed in these columns.* The system has excited considerable interest, and in a slightly modified form has been adopted in several manufacturing establishments, among them being the well-known Dickson Manufacturing Company, of Scranton, Pa. Below is a complete reprint of a little pamphlet printed by the Dickson Company and intended to explain to their foremen and men the working of the new system, giving specimens of the necessary blanks, etc. It should be explained that the shops of the Dickson Company are situated at some little distance apart, and that a great variety of work is carried on, locomotives being built at the Cliff Works; large stationary engines, steel-plate car wheels and a great variety of heavy machinery at the Penn Avenue Shops, and smaller stationary engines, mining machinery and cast-iron wheels at the Wilkes-Barre Shops. The force employed at present is about 1,200 men. It will be seen the task of keeping accurate accounts of the cost of each piece of work is difficult, and that the case somewhat resembles that of a railroad where the different shops are widely separated. It is, of course, more difficult to ascertain and systematize the cost of repairs than of new work. In building an entirely new locomotive, the work to be done can be all mapped out beforehand, but when the same engine has to be repaired, new defects are constantly being discovered whilst the work is in progress. Nevertheless, we believe many of our readers will derive some useful hints from a careful study of Captain Metcalf's system, as adopted at the Dickson Locomotive Works, and detailed below:

The new system of accounts about to be adopted by the Dickson Manufacturing Co., briefly outlined below, follows the plan proposed by Capt. Henry Metcalf, which has for its basis the recording of all the data showing the expenditure of either time or material on any piece of work, by the party making such expenditure, and at the time of the transaction, thus entirely doing away with the errors due to forgetfulness and neglect and relieving foremen from book-keeping.

The blanks for these returns will be the "Time Card," upon which the workman will mark the hours spent upon each job, with the character of his work, and the "Material Card," upon which the foreman will report the quantity of all material used on any shop order.

The Time Card† when properly filled out will show:

1. The workman's number.
2. His name.
3. The number of his machine.
4. The number of hours he has worked upon each shop order during the day.
5. The number of the shop order—in the space marked S. O.
6. The character of the work, whether chargeable to "Work" or "Plant" (see further) in the space marked C.
7. The object or part of the product upon which he has been working, in the space marked O.
8. The kind of work he has been doing on the above-named object, in the space marked N.

This information written out in full would require much time and space on the card. To obviate these objections, symbols will be used under the 6th, 7th and 8th headings.

The first four items, his number, name, number of machine and number of hours worked, the workman will be able to furnish himself. From the order received from his foreman he will get the shop order number and the information required for the filling of the space C. From the drawing he will get the symbol or name of the piece upon which he has been working, and from printed cards on his machine the symbol for the kind of work he has been doing.

DATE.... HOURS.... PIECES....

TIME CARD. DICKSON MFC CO.		MACHINE.	
No.	NAME.	No.	Rate.
329			
CHARGE TO	NATURE OF SERVICE IN DETAIL.	RATE PER UNIT.	
S. O.			
C.		Hours.	Pieces
O.			
		Amount.	
N.	Make but one entry on each card.		

The cards are arranged under their "Shop Order" numbers, so that when a man works upon more than one job during the day it will be necessary to have a separate card for each.

The foreman will collect the books containing these cards, tear out the entries made for the day, inspect them, and if correct stamp them, showing date and his approval; they are then forwarded to the Time Clerk at the general office. The books are returned to the men when they take their checks in the morning. When the books are not so taken out, it is assumed the men are absent, and the foreman will return a blank card from such books, stamped as described, with his filled out cards. When a workman leaves the service of the company, the foreman must note the fact on the last time card turned in; the book can then be issued to the man who takes his place.

When new men are hired, or when the rate of wages of an old hand is changed, the foreman must mark the rate per hour on the first time card turned in, for the information of the Time Clerk.

Men on piece work will turn in a card every day giving all the particulars required of other employés, but the card must be plainly marked "Contract" across the face. When the work on hand is finished, the card for that day should be marked "Contract finished" and should show the number of pieces completed. The rate per unit or piece is filled in by the foreman when he examines the cards, and they then go to the Superintendent of the works for his approval before being sent to the Time Clerk.

The Time Clerk sorts the cards by their numbers, fills in under proper headings each man's rate of wages per hour, the rate attached to his machine, and the sum due on each card. The total number of hours worked during the day or the amount due on any contract job is entered opposite the workman's name on the pay roll and the cards turned over to the Cost Clerk. The Time Clerk will note particularly the following points:

1. That there is a card returned each day properly accounting for every man on the rolls.
2. That all cards show the approval stamp of the foreman.
3. That all cards showing amounts due under piece work contracts have been approved by the Superintendent of the works, as well as by the foreman. Until they are so approved, they must not be entered upon the rolls.

When the returns from any of the shops are faulty under the above headings or fail to show the proper entries, he will at once report the fact to the Superintendent, for immediate correction.

MATERIAL CARD.

Dickson Manufacturing Co...... .... 188.

RECEIPTS AND ISSUES.

FROM.....To.....

PER ABSTRACT.				
VOUCHER.				

QUANTITY.	NAME.
No. UNIT. ASSUMED.	
ACTUAL.	
PRICE PER UNIT.	
AMOUNT.	

CHARGE TO				CREDIT TO			
S.-O.	C.	O.	N.	S.-O.	C.	O.	N.

PACKAGE.		
KIND		RECEIVED FROM OR SENT TO
NO.		
WT.		
MEASURE		

RECEIVED BY	Foremen purchase here. Storekeepers punch here.	ISSUED BY	Foremen punch here. Storekeepers punch here.

AUTHORITY.

The Material Cards are to be Used:

1. In making requisition for supplies from the storekeepers.
2. In reporting the use of any material, in working up a shop order.
3. As a receipt for material or product delivered to another department or used on a shop order other than that originally charged.

Foremen in making out a requisition for supplies either for immediate use on some order or to be kept in stock, should give full details of what is wanted on the back of the card. At the right hand end they should fill out the date and put their punch mark on the first line headed "Required by." On the face of the card under the heading "Assumed" they should fill in the total number of pieces or units, such as pounds, tons, feet, etc., and the name of the material, without going into details. Under "Charge to" they should give the number of the "Shop Order," if the material is to be used on that order alone, or the symbol for their shop, if the material is to be kept on hand. The card so filled out is sent to the Superintendent, if he approves of the requisition he dates and uses his punch on the line marked "Approved by" on the back; the card is then sent to the Storekeeper.

When the goods are received they are to be inspected by the foreman ordering them, and if all right he acknowledges their receipt by punching in the space marked "Received foreman" at the bottom of the original requisition card.

* See *Railroad Gazette*, page 204, March 19, 1886.

† The time cards and other blanks are printed as used, but are on a reduced scale, the actual cards being larger and having bolder type.

When any items are rejected the fact should be stated in detail on the face of the card, so the foreman shall only be charged with the goods actually received.

When the general material on hand at any shop is used on a shop order, the foreman must fill out the face of the card showing the number of units and kind of material used, the number of the shop order, the character of the work, that is whether the order is for "Work," "Plant" or "Tools," etc., the name or symbol for the piece upon which the material was expended and the symbol for the operation performed. Under the head of "Credit to" he will simply give his shop number against which the material was charged when drawn from the store. His punch mark should be in the space marked "Issued by foreman."

When material or worked up product already charged to some shop or shop order is taken for the use or benefit of some other department or order, a card made out in a similar manner, charging the order getting the material and crediting the one from which it was taken, must be punched by both foremen, one as issuing the other as receiving. When foremen draw from the store a bill of material to be used exclusively on one shop order, nothing more than the original requisition card is required, unless the material is transferred to another order.

All material cards must be made out at the time the transaction takes place and must be turned over to the Storekeeper the same day.

SHOP ORDER NO. FOR	REQUISITION FOR MATERIAL.
QUANTITY. DESCRIPTION.	From..... For..... Date. Action. .....Required by.... .....Approved by... ..... " " ... .Ordered by..... From per order No ..... To be received by Date received..... Date issued.....

☞ Do not make entries for more than one shop-order on same card.

Symbols are employed to represent:

1. The character of the work, whether it be upon orders for outside parties or for the benefit of the company's plant.
2. The object or name of the part of a machine upon which a man works or upon which material is expended.
3. The kind of work done on any piece or part.
4. The name of each shop or department.

Under the first heading, "Character" or "C" on all the cards we have:

W. Work.—Includes labor and material expended upon shop products for outside parties.

P. Plant.—Includes labor and material expended upon any product for the benefit of the permanent plant of the company, such as drawing patterns, gauges, special tools, repairs to buildings, floor tools, etc.

Standing Shop Order, S. 70.

A. Attendance.—Includes the time of superintendents, foremen, bookkeepers, engineers, firemen, sweepers, watchmen, porters and all employés not chargeable to distinct shop orders.

Standing Shop Order, S. 75.

T. Tools.—Includes the expenditure in labor, material or money for hand tools or such parts of floor tools as need constant renewal.

Standing Shop Order, S. 80.

Under the second heading, "Object" or "O," on the cards, the symbols will be marked on the drawings of all standard machines; in other cases the name of the piece will have to be written out on the time and material cards.

The following list gives the symbols for the operations which are to be recorded under the heading N on the cards:

AN ANALYSIS OF OPERATIONS.

Class I.

Heating	101	Puttying or filling	116
Drying	102	Painting	117
Annealing	103	Varnishing	118
Melting	104	Whitewashing	119
Tempering	105	Plastering	120
Case-hardening	106	Stamping	121
Pickling	107	Printing	122
Cleaning	108	Stenciling	123
Washing	109	Etching	124
Blacking in oil	110	Laying up brick-work	125
Browning	111	" " stone-work	126
Plating	112	Moving by hand	127
Polishing	113	" " team	128
Burnishing	114	" " power	129
Oiling	115	" " traveling-crane	130

Class II.

Straightening	201	Winding	207
Bending	202	Twisting	208
Forming and flanging	203	Blocking into shape	209
Folding	204	Mandreling	210
Indenting	205	Spinning	211
Calking	206		

Class III.

Molding, green sand	301	Forging	311
" dry	302	Swaging or pressing	312
" loam	303	Steam hammer, No. 1	313
" brass	304	" " " 2	314
Casting	305	" " " 3	315
Babbitting	306	" " " 4	316
Core making	307	" " " 5	317
Billeting	308	" " " 6	318
Rolling	309	" " " 7	319
Machine molding	310	Wire drawing	320

Class IV.

Shearing	401	Hand chipping for calking	404
Punching rivet-holes	402	Machine edging	405
" flue-holes	403	Chipping	406

Class V.

Turning	501	Tapping nuts	506
Clamp milling	502	Boring	507
Screw "	503	Drilling, counterboring, etc	508
Thread cutting, male	504	Reaming	509
" " female	505	Cottering	510

Class VI.

Planing	601	Sawing	604
Slotting	602	Milling	605
Broaching or drifting	603	Shaping	606

Class VII.

Scraping	701	Tumbling	704
Hand filing	702	Grinding	705
Rotary filing	703	Lapping	706

Class VIII.

Welding	801	Forcing	809
Melting together	802	Setting flues	810
Brazing	803	Setting stay bolts	811
Soldering	804	Riveting "	812
Gluing, Nailing, Screwing,	805	Mixing	813
		Assembling (includes loading)	814
Riveting by hand	806	Packing	815
" machine	807	Assorting	816
Bolting	808	Erecting at site	817

Class IX.

Superintending	901	Gauging	906
Designing	902	Inspecting	907
Recording—clerks	903	Alterations	908
Fitting or finishing	904	Improvements	909
Weighing	905	Corrections	910

The shop names will be shown by the standing shop orders as below:

	Penn Ave.	Cliff Works.	Wilkes-Barre.
General office	S. 5	.....	.....
Superintendent's office	S. 10	S. 30	S. 50
Storehouse	S. 11	S. 31	S. 51
Tool room	S. 12	S. 32	S. 52
Drawing room	S. 13	S. 33	S. 53
Machine shop	S. 14	S. 34	S. 54
Machine shop B	.....	S. 35	.....
Pattern shop	S. 16	S. 36	S. 56
Smith shop	S. 17	S. 37	S. 57
Boiler shop	S. 18	S. 38	S. 58
Foundry	S. 19	.....	S. 59
Gas engine shop	.....	S. 40	.....

CORRESPONDENCE CARD.

FROM	TO		
PRESIDENT	PRES.		
Gen'l Accountant	Gen'l Acct.		
Treasurer	Treas.		
Paymaster	P. M.		
Gen'l Storekeeper	Gen'l Stkp.		
Pay Clerk	P. C.		
Stock Clerk	S. C.		
Cost Clerk	C. C.		
GEN. SUPERINTENDENT	GEN'L SUPT.		
MECHANICAL ENG.	M. E.		
Foreman of Machine Shop	1	900	1,700
Machine Shop		1,100	
Foundry	600		1,800
Smith Shop	300	1,200	1,900
Boiler Shop	500	1,400	2,000
Pattern Shop	400	1,500	
Gas Engine Shop		2,200	
Brotherhood Engine	2,300		
Laborers	800	1,600	2,400
Outside Supt.	O. Supt.		
SUPT. PENN AVENUE	Supt. P. A.		
Storekeeper Penn Avenue	Stk. P. A.		
SUPT. CLIFF WORKS	Supt. C. W.		
Storekeeper Cliff Works	Stk. C. W.		
SUPT. WILKESBARRE	Supt. W-B.		
Storekeeper Wilkesbarre	Stk. W-B.		

In starting card, draw line through your name.
Keep course line continuous.

The "Correspondence Card" here shown is a convenient medium of intercourse between the different offices and departments. One side (not shown here) is reserved for written matter; the face shown above shows the destination.

The person sending the card draws a horizontal line through his own title in the left hand column, thence to the name of the official for whom the card is intended in the right hand column.

Where there is space, the answer should always be returned on the same card, and the course line can then be carried horizontally to the left hand column and across to the right again.

In all cases keep the course line unbroken so the end will show the party to whom the card is to be sent.

THE SCRAP HEAP.

Old Employes.

Three railroadmen occupied double seats on Conductor Hanna's train, on the Auburn Division of the Central-Hudson, the other day, whose terms of service with the company aggregate 127 years. Their names were as follows: Robert Ray, Agent of the New York Central Sleeping Car Co., who has served 46 years; Julius Sedgwick, a carpenter, who has served 44 years, and Barney Bennett, roadmaster of Canadaigua, who has been in the employ of the company 37 years.—*Rochester (N. Y.) Democrat and Chronicle.*

The Wisconsin Farm Mortgage Land Co.

A Washington dispatch of May 27 says: "Land Commissioner Sparks, in a decision this morning, rejected the claim of the Wisconsin Railroad Farm Mortgage Land Co. to about 123,000 acres of indemnity lands selected in 1882 and 1883 under the act of June 3, 1856. The Commissioner follows the decision of the Court of Claims and the Supreme Court in the case of the Chicago, Milwaukee & St. Paul Railroad Co. *vs.* The United States, and holds that the action of the state in disposing of the lands granted for the construction of the road between Portage and Tomah for the benefit of the Farm Mortgage Co. was a diversion of the same from the purpose for which they were granted; and while Congress assented to such diversion its assent applied only to the lands which had been certified to the state prior to the passage of the act of July 27, 1868, and not to lands which were then unselected and uncertified and which were not co-terminous with the road between Portage and Tomah. He therefore holds the company's selections for cancellation subject to appeal within 60 days."

Fastening Express Car Doors.

Here are the standing instructions of express companies to messengers in regard to keeping their car doors closed and locked. A strict observance of them will make repetitions of the Chicago & Rock Island case an impossibility.

"Chain fasteners must be affixed to the end doors of all cars used for our business, and kept in constant use when car is occupied. If fasteners are not so provided, messengers will report the fact to their superintendent.

"When alone in the car, whether in motion or at a station, messengers must never open the door to a call for admittance, *even if certain that the party requesting admission is known*, unless the fastener is applied to keep the door partly shut.

"When approaching a station all the doors of the car must be securely fastened, except the one through which business is received and delivered, and, as soon as this is done, *that door must also be closed and fastened*, until the train is under sufficient motion to prevent persons entering."—*Express Gazette.*

A Boiler Explosion in the Round-house.

On the afternoon of June 1 a locomotive standing in the round-house of the International & Great Northern road at Palestine, Tex., exploded its boiler. The engine was completely wrecked, and much damage done to the building and to other property. It is estimated that the loss to the company will reach $100,000. Five locomotives standing in proximity to the exploded engine are very badly damaged. The shock of the explosion was so great that 30 men among the workmen in the shops were so violently thrown to the ground that they were unable to work. Nearly all of them suffered from pains in the head, and were partly deaf for several days.

Pathfinders.

The conductor's motto—"Play fare."

"Please, conductor, won't you turn this seat for me?" "What? You want to look one way and ride another, do you? Not much you can't. What do you take this train for—a row-boat?"

"Do you really think," asked the passenger, "that you could run this road better than the superintendent and president?" "You bet your sweet life I could," replied the brakeman, "I could run it a thundering sight better, for the brakeman." And, after all, that seems to be the only point on which capital and labor take issue.

"Why didn't you buy a ticket, madam? You would have saved yourself no end of trouble and expense. Now you'll have to pay local fares all the way to Chicago." "Well, I couldn't. I went to the office and the agent had nothing but white tickets with blue edges, and I couldn't take them. I'm in mourning, you see."

"Where did you get on?" asked the conductor. "Last station," calmly replied the dusty one. "Now look here," said the conductor, "you've been riding 50 miles. I saw you crawl out from under the car." "'Course you did!" indignantly exclaimed the tramp, for it was he. "'Course you did! You didn't expect me to ride all the way to St. Louis on the tracks! Good land; I'd rather walk." He walked.

"What's the rate to California this morning?" asked an eager citizen, rushing into a ticket office in Chicago. "When are you going?" asked the agent. "First train that pulls out." "All right, here is your ticket, this is an order for a berth in the sleeper, and this is the dollar you will be expected to pay the porter. Your meals will be furnished on presenting this ticket, and if you'll just step into the back office the company's tailor will fit you with a traveling suit. Now do you want any money? No? Fixed all right to do the trip in first-class shape, eh! All right, then; train will start as soon as you get on your new clothes. Remember us whenever you're going out again, and mention the Lariat Line to your friends."—*Burdette, in Pathfinder Guide for June.*

The Conductor's Duties.

A man was bounding around in a car on a new Dakota road when the conductor came through.

"Can you tell me," said the man, with a great show of sarcasm, "whether this car is on the track or not?"

"Sir!" replied the conductor, reaching into his pocket, "here is a volume of the rules and regulations of this road."

"But what do I want of it?"

"Look it over and see if you can find any rule saying that I must spend my time running alongside of the train reporting its position to the passengers. See if there is anything in that volume that compels me to go humping myself along on the prairie and yelling through the windows 'Four wheels off now!' or 'Hind trucks dragging on the ties!' or 'Gentlemen, the baggage car has just rolled into the ditch!' or 'Passengers will please remain seated while we turn off here and scoot across the prairie after a jack rabbit!' Look over them rules, sir, and see if you find any of them directions. If you don't, in the future please take your own observations on the wheels."—*Estelline (Dak.) Bell.*

The Coupler Fiend.

Since it became known that the Commissioners were interested in saving the lives and limbs of railroad employés by securing the application of automatic couplers, the inventors have forwarded them models of every conceivable kind of mechanical appliances for car coupling. Some of them are decidedly ingenious, others are cumbersome, while a few are constructed upon the principle that freight cars should be locked together as tightly as the jaws of a steel vice. Railroad men are agreed that there should be some play in couplings for freight cars, and they pass over models which do not recognize this principle. Some of the couplings are made to be operated by a lever projecting beyond the side of the car. Others seem to be constructed for operation solely from the tops of cars. One of the simplest of the collection now in the Railroad Commissioners' office was invented by a mechanic employed by the New York Central. Every inventor who forwards his model invariably accompanies it with the modest explanation that "this is the best thing ever yet invented."

"Probably a hundred models have been sent to the Commissioners, perhaps more," said Secretary Hudson. "Many of them are exceedingly ingenious. Some of them are so expensive that they are impracticable. I remember sitting here in the office one day when a chap came in, followed by five associates. Each of them had a bundle. The leader just cast one glance at me, and then without a word he undid his bundle and commenced to lay a miniature railroad track all around the floor and into the Commissioners' private rooms. The fifth man produced a lot of cars, and the last man drew a locomotive out of his package. Then I began to get interested. The leader arranged the track so that it ran up and down heavy grades and around sharp curves. Then he lighted a match, touched it to the locomotive, and away went the miniature train at a great rate of speed. Then he purposely caused an accident to the train, and the object of the invention became apparent at once. Every car uncoupled from its neighbor as if by magic. Some of them remained on the track and others toppled to the floor. He repeated this several times, and each time the mechanism completely demonstrated that the cars immediately become detached from each other. It was the most ingenious device I ever saw. The amount of gearing and mechanism necessary for each car simply made the invention enormously costly, and of course impracticable. He thought he had fortune by the throat, and I could not convince him to the contrary. I yielded to his solicitations for letters of introduction to two practical railroad men, and away he went. I afterward received notice from these gentlemen that my life would be in danger if I ever sent any more inventors to them."—*Albany Correspondence New York Times.*

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE MEXICAN RAILWAY IN 1885.

The Mexican Railway (Vera Cruz to Mexico) suffered a further decrease of earnings in the last half of last year, and for the entire year its gross and net earnings were the smallest since 1879. These have been, in Mexican silver, worth par in 1879, but falling in value to 81 per cent. of our currency in the last half of last year:

Year.	Gross Earnings.	Expenses.	Net Average.
1875	$2,370,605	$1,387,110	$987,495
1876	2.178.147	1,348,465	829,682
1877	2,700,907	1,539,910	1,164,997
1878	2,894,252	1,474.190	1,420,062
1879	3,257,435	1,461,521	1,795,714
1880	3,709,908	1.562,320	2,147,588
1881	4,935,100	1.803,712	3,131,388
1882	6,011.280	2,216,227	3,795,053
1883	5.712.271	2,609,781	3,102.490
1884	3,756,718	1,505,726	2.250,992
1885	3,323,110	1,372,415	1,950,685

The net earnings this year were equivalent to $1,580,055 in gold, which is 12 per cent. less than in 1879, before the new railroad construction in Mexico and the consequent great increase in business and traffic began. How greatly this railroad profited by the Mexican "boom" is shown very clearly above, the net earnings more than doubling from 1879 to 1882, while they had already increased 80 per cent. from 1875 to 1879. And though the figures show clearly enough that the great growth after 1879 was exceptional, they also show that there has been an important gain since 1876, which gives good reason to expect further gains (to the traffic of the country, if not to this particular railroad) in course of time hereafter.

Indeed, the *traffic* of the road has not fallen off so much as its earnings, having been in each half of the last seven years:

	Carried one mile.		Earnings.	
	Tons.	Passengers.	Freight.	Passengers.
1st half 1879..	9,028.263	7,930 361	$1,309,695	$255,680
2d " 1879..	9,551.440	7,535,685	1,389,885	234,010
1st " 1880..	10.628.355	8.694.874	1.476,615	287,075
2d " 1880..	10,656,626	7.287,971	1,633,250	238,985
1st " 1881..	16,557 945	8,614,824	2,214,315	283,260
2d " 1881..	11,602,133	8,419.499	2,068,080	279,585
1st " 1882 .	18,907,476	10,184,921	2.364,360	340,310
2d " 1882..	21.344,879	9,831,566	2 864,465	328,255
1st " 1883..	20,755,560	9,978.205	2.764,465	352,605
2d " 1883..	18,118,701	10,133.346	2,140.150	331,425
1st " 1884..	12,888 356	10,087,023	1,606,750	341,470
2d " 1884..	11.478,013	8,487,653	1,394,265	283,310
1st " 1885..	12.177.198	9,580,483	1.460.200	313,065
2d " 1885..	11,529,743	8,196,891	1,204,920	216,865

Here we find that the freight traffic last year was a twelfth more than in 1880, and 28 per cent. more than in 1879, though the freight earnings (in silver) were $2,699,580 in 1879 and $3,109,865 in 1880, against $2,665,120 in 1885. The average rate received was 14.5 cents per ton in 1879, 15.1 in 1880, but "only" 10.45 cents last year. The passenger traffic did not increase like the freight, nor has it decreased like it, being last year larger than in any other before 1882, and but 11 per cent. less than in 1882 and 1883, when it was largest, though it was less in the *last half* of last year than in any corresponding half-year since 1880. The passenger fares were pretty well maintained until the last half-year, having been 3.17 cents per mile in 1879, 3.24 in 1883, 3.27 in first half of 1885, but only 2.655 cents in the last half of that year. The earnings from both passengers and freight were less in the last half of 1885 than in any corresponding half-year since 1885.

The Mexican Central Railroad greatly increased the traffic of the Mexican Railway until it was completed between El Paso and Mexico, but since that time, and especially last year, it has reduced it by competing for the carriage of the merchandise which the city and country import. Thus the Mexican Railway freight, which was 31 millions of ton-miles in 1881, 40 in 1882 and 39 in 1883, fell to 24 at once in 1884, and to 23⅔ last year. But the latter amount is so much greater than before 1881 that, considering the amount diverted by the Mexican Central, the traffic of the country must have greatly increased since then. The foreign freight is reported separately by the Mexican Railway, and it was this which gave it the larger part of its gain in earnings when they were increasing, and which has fallen off most since.

Thus through freight has been in tons of 2,240 lbs.:

	Ton-miles.		Earnings.	
	1st half.	2d half.	1st half.	2d half
1878	2,659,799	2,928,787	$550,800	$657,310
1879	2,876,610	2,955,870	710,890	730,480
1880	3.336,404	3,929.371	824,535	971.060
1881	9,928,067	6 817.273	1,548,655	1,344,430
1882	9,771,258	14,884,934	1,625,275	2,074,345
1883	13,501,901	10,149,000	2,101 630	1,473,900
1884	5,339,217	4,713,849	1,024,890	836,090
1885	.....	4,437,829	... .	651,600

This shows the effect of the new competition very clearly; for while the road carried twice as much imported freight in the last half of last year as in the last half of 1879, it received less for carrying it, the average rate per ton per mile on this freight having fallen from 29½ cents (!) in the last half of 1879, and 24.7 in the last half of 1880, to 14.4, 14.5, 18.7, and 14.7 cents in the last half of the last four years respectively. Between 1880 and 1884 the average on this freight was reduced by the large imports of railroad materials, etc., carried at less than the average rates, hence the increase in the average from 1883 to 1884; but in the middle of the last half-year a general reduction in the company's rates was made, which has brought down the average again and probably prevented a greater reduction in this traffic than has actually occurred. The rates on imports last year were but about half as high as in 1879, but, being equivalent to 11.9 cents gold per ton per mile, were nine times as great as the average on all freight in the United States for the last year reported (1.287 cents). The export freight last year was larger than ever before, but it was still very insignificant, yielding in the last half only $25,890. The pulque traffic, which had been greatly reduced by the competition of a new road to the producing district, about 50 miles east of the City of Mexico, falling from 31,590 tons in the last half of 1883 to 19,141 in 1884, was almost recovered last year, when it was 30,937 tons; but the rates on it have fallen off one-third, from 13 cents per ton-mile to 7.2. This beverage formed more than one-fourth of the whole number of tons hauled by this railroad in the last half-year, and produced 8¾ per cent. of its freight earnings. Foreign freights yielded 54 per cent. of these earnings then, against 72 per cent. in the last half of 1882. The amount is still so large and the rates received on it so high that the company has much to fear from the competition of a competing line to the Gulf.

It will be seen that in spite of the reduction in rates on this road, the proportion of expenses to earnings is smaller now than before 1881. They remain very high, however, being in the last half-year $2.56 silver (= $2.07 gold per train mile), with an average train-load of 99 passengers and 74½ tons of freight, against an average of 42½ passengers and 150 tons of freight in this country, where the average cost per train-mile is 92 cents and the earnings $1 per passenger train-mile and $1.50 per freight train-mile ($2.13 gold for passenger and $6.28 for freight on the Mexican). If the cost for freight trains in Mexico is one-half more than for passenger trains, it is $2.23 gold, or just about 3 cents per ton per mile, leaving it $1.49 per passenger train-mile, and 1½ cents per passenger-mile, which latter is below the average cost here, but leaves the profit in Mexico but 30 per cent. of the passenger rate, while it is 65 per cent. of the freight rate. There thus remains a considerable margin for reducing the freight rate.

The company can live with small profits, its funded debt requiring $678,360 per year for interest, which is less than one-half of the net earnings last year. But the ordinary stock and the second preference stock already go without dividends, the profits of the last half-year just about yielding 3 per cent. on the first preference stock, which is entitled to 4 if earned. From the profits of the last half of 1882, not only were full dividends paid on both preferred stocks, but 7 per cent. on the common stock.

Experimental Iron Cross Ties.

The brief note which we recently published in respect to the experimental use of iron cross-ties on the Pennsylvania Railroad seems to have called out a good many inquiries, as a sort of general response to which the Chief Engineer forwarded us the engraving which appears in another column. The day when iron or steel cross-ties will be in general use seems still far in the future, but it may be near at hand for some lines. It is, therefore, well that such tests as the Pennsylvania is making should be recorded, since the conditions are quite different in some respects here and in Europe, and adequate evidence from experience requires many years.

The ties illustrated weigh almost exactly 120 lbs. each, and at the current price of about 3 cents per pound for channel and beam iron are worth $3.60 each. Angle-iron, which is an inferior quality, costs about 2 cents. Steel rails at $35 per ton cost 1.56 cents per pound. Cross-ties like those illustrated weigh 40½ lbs. per yard, and the section is, or by simple modifications might be made, not materially more difficult to roll than rails, for rails, except that the enormous demand has brought the art of rolling them down to a very fine point, would be considered rather awkward things to roll, owing to the unequal thickness of the metal and its thinness at the edges.

In Europe, where thousands of miles of railroad have been laid with iron ties and contracts are given out frequently for large quantities of many different patterns, the price is somewhat higher for ties than for rails, but not very much higher. There very great pressure has been exerted to secure their use, in order to give employment to iron works which have for two or three years found orders very scarce, but in Germany they seem often to be preferred. The comparison with wooden ties cannot be made directly, because it is complicated by the different cost of keeping up the track with the different ties, and the different kinds of road-bed suitable for them. There is by no means unanimity of opinion on these matters among those who have had experience with metal ties, concerning which there is already an extensive literature. It would appear, however, that it is the general opinion that superior ballast is necessary for iron ties, and that for a time a track laid with them requires more labor for maintenance than a track on wooden ties, but later just about the same. The use of metal (steel for the most part) is evidently extending in Germany, though the published reports of experience and the opinions of those who have charge there are by no means uniformly favorable, and wood is cheaper and steel a little dearer there than in England. In Belgium and France the use of metal is experimental only, and on a small scale; but the iron manufacturers are using every effort to extend it. The Germans have had so large and long an experience with so many different patterns that no one who purposes trying metal ties can afford to neglect it. They have at least learned some of the things which are to be avoided.

Although, as we have said, other elements than the first cost of the two kinds of ties and their life have a bearing on their economy, these are the chief elements: and to any one purposing to use metal the following calculations will be of assistance:

The sum which, if invested now, will produce $1 at compound interest in 8, 16, 24 and 32 years at various rates of interest, is as follows:

	4 p. c. Cents.	5 p. c. Cents.	6 p. c. Cents.	8 p. c. Cents.	10 p. c. Cents.
8 years	73.06	67.68	62.74	54 03	46.65
16 "	53 40	45.81	39 36	29.19	21 76
24 "	39.02	31.73	24.70	15.77	10.15
32 "	28.51	20.99	15.49	8.52	4.74
40 "	20.84	14 21	9.72	4.60	2.21

Then, making no allowance for possible difference in keeping up track, if a wooden cross-tie which will last eight years cost $1, the sum which may properly be paid for an iron tie which will last 16 years, and thus save buying a dollar tie now and another dollar tie at the end of eight years, is at 4 per cent. interest, $1.00 + 0.736 = $1.74, and at 10 per cent. interest $1.00 + 0.466 = $1.47. If the ties will last as long as 24 years, another renewal is saved at the end of 16. Also, when the metal tie is worn out it has a certain future scrap value, which for simplicity's sake may be assumed to be the same sum which will buy (and put in the track) a new wooden tie, which we are assuming at $1. It might be either more or less than this, but could not vary greatly. The present worth of this future dollar of value is whatever sum will produce a dollar at the date of renewal with the given compound interest, as shown in the table above. Consequently, if an iron tie will last 16 years, its present value is not only the present value of two wooden ties lasting eight years, but the value of an additional wooden tie lasting eight years longer yet must be added.

In Europe no calculation makes the life of a pre-

served oak tie less than 16 years, and there would, therefore, be no economy in metal if it lasted no longer than that and cost as much as preserved oak. There is a singular avoidance of statements of the probable life of metal ties, but no one seems to claim that they will be what might be called "permanent," and some question whether they will last longer than the 20 years which they claim for preserved oak. The fact seems to be that the experience with *approved forms and weights* of metal ties has not been long enough to show how long they will last, yet long enough to show that they deteriorate with time, though it is said they do not rust in ballast. The older patterns were quite generally too light or too weak in places, and the result with them has little value except to teach us to avoid such patterns.

Allowing the old iron tie to be worth as much as a new wooden tie, we obtain the following table of the justifiable expenditure for metal ties of various estimated durabilities, and at various rates of interest, as compared with wooden ties at $1; in other words, the number of times the cost of wooden ties which we can afford to spend for metal ties:

Life metal ties.	Rate of interest on capital. 4 p.c.	5 p.c.	6 p.c.	8 p.c.	10 p.c.
8 years	$1.73	$1.68	$1.63	$1.54	$1.47
16 "	2.26	2 13	2.02	1.83	1.68
24 "	2 65	2.45	2.27	1.99	1.79
32 "	2.94	2 66	2.42	2.08	1 83
40 "	3.15	2.80	2.52	2.12	1.86

It will thus be seen that under no possible circumstances can iron or steel ties be a good investment at much more than three times the cost of wooden ties. Included in the latter, however (as well as in the cost of the metal ties) should be the cost of haulage and putting in, since that is saved at each renewal as well as the price. It is possible, of course, that within a few years the cost of steel ties of acceptable quality may be reduced down to $1.50 or even less, and then they will crowd wooden ties hard in many parts of the United States. If their use should ever become general the market would be enormous, as not less than 32 lbs. per yard *of rail* would be required, or about half as much again as is now laid in track, if ties such as that illustrated were used at the usual rate for wooden ties, 16 per 30 ft. rail. More probably, less ties would be used, and 10 lbs. per yard more or less added to the rail section, but this would not affect the aggregate increase in metal demanded, which is just 50 tons per mile of track, or 8,000,000 tons for the railroads of the United States.

Of course, if the day for the general use of metal ties ever comes for our railroads, it will not come all at once. There are some lines or parts of lines on which they will be advantageous long before they will be generally advantageous. The line on which wooden ties in track cost $1.25 or more, and where the climate makes them short-lived, will find its advantage in metal when the line that gets good ties along its track for 25 cents cannot think of them. But the first trials on a considerable scale are not likely to be made, unless the calculations show not merely a bare balance in their favor, but a great advantage, because the advantage is not yet proved, and especially is this the case with companies which have now to pay high rates of interest for money, because they may reasonably hope before the end of the life of their iron ties to be able to get money for 3 or 4 per cent. instead of 6. But most of the questions concerning such ties are likely to be settled for us, long before we can settle them ourselves, by European experience; and when this has established pretty definitely the life of such ties and the patterns which will certainly stand the test of use, no such great margin for possible failure or mistake need be allowed. It would seem probable, however, that we shall pass through an intermediate stage of preserved wood ties before reaching that of metal ties, as Germany has done, unless iron goes down in price very fast. If a cross-tie can be made to last 16 years instead of eight by burnettizing or other treatment, so as to cost one dollar in the track, then the value of a metal tie lasting 32 years by the above table would be no more than as follows:

4 p.c.	5 p.c.	6 p.c.	8 p.c.	10 p.c.
$1.82	$1.67	$1.55	$1.38	$1.26½

There is no great prospect of these prices being met very soon, even if such a life as 32 years could be anticipated, which has not yet been proved. Nevertheless, some of the roads in Mexico and the far West are situated very differently from those elsewhere on the continent, and it may reasonably be claimed that it would be profitable for some of them to lay iron ties now.

The Prices of Corn and Railroad Rates.

The Chicago *Tribune* says that on a recent consignment of corn from Nebraska the price realized in Chicago was 27 cents per bushel, 22 cents of which was absorbed by the transportation by railroad, the storage and commission. It says that farmers cannot raise corn at this price, which is true, and it urges that there should be a reduction in all these charges; for the storage, it says 40 per cent. of the present rate would be enough, and "for the railroad part of the charge, it may be said to be too high by not far from the same ratio, and such a reduction would pay fairly for the service if the roads were capitalized on the basis of actual value, instead of being watered to death on their stock."

It happens that the railroads from Chicago into Nebraska have capital accounts which are among the lightest in the world, and it is questionable if any of them could be reproduced to-day for their present stock and debt. It is true that some of them, perhaps all of them, have issued stock for which there was not received an equivalent in cash, but all of them have expended large amounts of net earnings for construction, and most of them have bought a great deal of railroad after it had failed for much less than its cost. But whether the capital of these companies be excessive or not, it will be hard to show how they could carry corn from Nebraska to Chicago for 40 per cent. of their present rates without making other business pay part of the cost of hauling it. This is just the freight which pays the lowest rates now, and the bare working expenses of these railroads amount to from 54.3 to 59¾ per cent. of the total receipts from all traffic (Chicago, Burlington & Quincy, 54.3 per cent.; Rock Island, 59¾; Milwaukee & St. Paul, 59¼; Chicago & Northwestern, 58⅝ per cent). Now, for these railroads to receive but 40 per cent. of their present rates on all their traffic and pay out 54¼ to 59¾ per cent. of the present rate for wages and materials, is evidently beyond the power of the most skillful management. But if the reduction is made on corn alone, it must bring the rate still further below cost, because, as we have said, this already pays the lowest rate.

The rates charged on grain on these routes are already lower than are known in any other country in the world. They were made low because the country producing the corn is very distant from the country where part of it must be marketed when the country has a large crop. But farmers, like other people, plant crops which generally, or on the average, yield them a profit. For several years corn was high, and this encouraged its production so far west that when it sunk to the average price, even the bare cost of transportation to an Eastern or a European market was about all the grain would bring. Should the transportation be reduced, the result would be the production, when corn brings a good price, still further west, where there is land fit for it; but nothing can be more certain than that the cost, allowing nothing for interest on the capital invested, of carrying corn from Colorado or Utah to the seaboard is more than corn will bring in an average year. Rates can be made low enough to make it pay to ship corn such distances, but only by making other rates pay part of the cost of the transportation.

In this case, the corn must have been of very poor quality, as the price of No. 2 corn in Chicago was over 36 cents and for No. 3 over 32 at the time this sale at 27 was made—the highest of them a very unsatisfactory price for corn that has to be hauled by rail 500 to 700 miles. We do not understand, however, that it is the duty of a railroad to make any business profitable that any one may undertake anywhere on its lines. The average cost of hauling freight on such roads as the Northwestern and the Rock Island is something like ⅜ or ½ cent per ton per mile; the present *charge* from Kansas City or Omaha is about ⅝ cent. The cost is not so great for this long haul as for the average haul, and the present rate, doubtless yields a profit, though only a small profit. If the whole of the profit were taken from the rate, it could amount to little more than a cent a bushel between the Missouri River and Chicago, and probably to something more west of the Missouri.

This call for a reduction in the rates which are already the lowest is a commentary on the demands often made for uniform rates. A great many people complain that to charge ⅝ cent per ton per mile on corn when the average charge on all freight is 1½ cents or more, is an "unjust discrimination;" yet it is always these lowest rates which are felt to be a burden, and it is these almost exclusively that the shippers try hard to have reduced. The reason is plain: the rates were made low because this particular freight would not be produced for market if it had to pay the average rates necessary to pay interest on the cost of the railroad, and every time the price sinks below the average, its production becomes impossible, in spite of the low rates. But this is always the case with some freights, in the nature of things. For production goes on wherever and whenever there is any profit in it, and prices vary. The goods that it was barely worth while to produce at one price can only be produced at a loss at a lower price. Coal mines and quarries and the like get rates from the railroads which barely cover the cost of transportation when it will not pay to work the mines and quarries if any higher rates are charged. The railroads give the rates because, though the average profit required for such a service may be a dollar a ton, they cannot get that, and prefer to make 10 cents a ton rather than nothing at all. But then when circumstances have reduced a little the price that it is possible to get for the products of these mines or quarries, the proprietor cannot continue the production without a reduction in his expenses, and he goes to the railroad to ask for a further reduction of his rates, which often cannot be made without taking his goods for less than the cost of carrying them—that is, by the railroad company subsidizing him to enable him to carry on his business. The railroad may be making large profits and be able to do this, but if any business has any claims on it for a reduction in rates, it is that which pays very profitable rates for transportation, not that which yields little or no profit at all; but it is the latter, and usually the latter alone, for which a reduction is asked, and it is asked often in order to make it possible to carry on a business where circumstances have made it impossible to carry it on with profit.

"High Cost of Working."

The delusion that the proportion of working expenses to earnings is a criterion of economy in working is again shown in a call for a meeting of the Cincinnati, Washington & Baltimore bondholders in London this week, occasioned, a telegram says, by the Baltimore & Ohio's "working its own line, with its steep grades and sharp curves, at 50 per cent., and charging for the same traffic on the level grades between Marietta and Cincinnati 86 per cent." The Cincinnati, Washington & Baltimore bondholders and their predecessors of the Marietta & Cincinnati are a long-suffering generation, beginning with the farmers and other small capitalists of southeastern Pennsylvania and Maryland, who were induced to put their money into it when it was first built, since which there have been two reorganizations, but very little interest paid. But an examination of the reports of the road shows good reasons for its high rate of working expenses: by far the largest part of the traffic pays an extremely low rate, and the paying traffic is very light. Indeed, for two years past it is not probable that the through traffic has yielded any profit, and it is quite probable that it has netted a loss. If the Cincinnati, Washington & Baltimore bondholders have a legitimate complaint against the Baltimore & Ohio, which controls the Cincinnati line as the chief owner of its stock, it is for taking through traffic under such circumstances.

In his report for 1884 the General Manager of this road made a statement of the through freight traffic in 1880 and 1884, showing it had *decreased* from 106 to 67 millions of ton-miles, or 36·7 per cent., while the average rate received for carrying it had fallen from 0.787 to 0.589 cent per ton per mile, or 25 per cent., and the gross earnings on it from $834,566 to $395,178, or 52.7 per cent. Now, some great feats have been performed in the way of cheap transportation by American railroad managers, but they can hardly work a road for 50 per cent. of its earnings when its earnings are but 0.589 cent per ton per mile, especially when the road has but a light traffic. In 1885 rates were still lower than in 1884. Moreover, the expenses of the Baltimore & Ohio are not 50 per cent., but 66 per cent., of its gross earnings, taking the system altogether, while on the "Main Stem and Branches," the most profitable part, they were 59¼ per cent. The Lake Erie Division, a "trans-Ohio" line like the Cincinnati, Washington & Baltimore, cost 85½ per cent. of its earnings to work last year, and the Chicago Division 83⅝ per cent.—both more like the Cincinnati line than the Baltimore & Ohio Main Stem.

It may very well be true that it does not pay the Cincinnati road to cultivate this business, and that it does pay the Baltimore & Ohio, in the long run, to have it cultivate it. But if the through business was to be carried at all last year, it had to be carried without profit, and if a railroad carries a large part of its traffic without profit, even if without loss, the proportion of working expenses to earnings must increase. Imagine a road carrying 2,000,000 tons a year and receiving $2,000,000 for it, $1,000,000 of which is absorbed by working expenses. It is worked "economically" for 50 per cent. of its earnings. Now it seems wise to cultivate a traffic which does not pay now, but may pay hereafter. It takes 2,000,000 tons of that for $1,000,000, the whole of which goes for working expenses. The result to the proprietors is precisely the

same, but the working expenses have become 66¾ per cent. of the earnings. Still another 2,000,000 tons of the non-paying freight is taken, and we have $4,000,000 of gross earnings and $3,000,000 of working expenses, which is 75 per cent., while the net earnings remain $1,000,000 all the time. It is, however, a real danger that traffic may be taken for much less than cost, and the profits materially reduced thereby. All the trunk lines must have lost money thereby, and it is questionable whether they have often gained anything else by it.

The Cincinnati, Washington & Baltimore seems actually to be decidedly *not* a costly road to work, its expenses per train-mile in 1884 having been but 59 cents, while the average of railroads in the United States is 93 cents. Traffic and rates are what it needs, not a reduction in expenses.

The great work of changing the gauge of the southern railroads from 5 ft. to the standard was successfully accomplished this week. As we have noted from time to time, preparations for this change have been in progress for a long time past, and the final arrangements were made by agreement among the several lines at a convention held in February last. The work practically began last week, when all the principal lines commenced the changing of such branches as could be altered without affecting through traffic, in order to leave all the available force free for employment upon the main line. The great work of the change did not begin until May 31, when the Louisville & Nashville and its controlled lines, the Nashville, Chattanooga & St. Louis, the Cincinnati, New Orleans & Texas Pacific, the Memphis & Charleston, the western lines of the Central Railroad of Georgia and the Florida railroads changed their gauge, the other roads following on June 1. So far as heard from, the change was effected without delay or mishap of any kind, and on June 2 trains of the standard gauge were running throughout the South. The total length of road thus changed was about 11,500 miles. Some 1,500 miles of southern road had already abandoned the old 5-ft. gauge, the Illinois Central and the Mobile & Ohio having changed last year, while some of the Cincinnati, New Orleans & Texas Pacific lines were changed early in the present year. The question of changing has been under discussion for several years past, when it was seen to be inevitable, and the active preparations for it were practically begun nearly a year ago.

The 5-ft. gauge has now disappeared from the railroad system of the United States, following the 6-ft. and 5-ft. 6-in. gauges, which have now become only a matter of history. The present change, however, is the most extensive which has ever been made in this country at one time. The 5-ft. 6-in. gauge was confined chiefly to Texas and Louisiana in the United States, and its disappearance there was gradual, while the mileage of that gauge in Canada was chiefly controlled by two or three companies, and the change of their lines was comparatively a small matter. The 6-ft. gauge never extended very far beyond the Erie and its connections, the only other road of any importance which adopted it being the Delaware, Lackawanna & Western, which was not then a through line and had very little traffic which went beyond its own tracks, and this gauge also was abandoned very gradually. The 5-ft. gauge differed from both of these in being the standard for a large section of the country, where it was not exceptional but universal, and its simultaneous abandonment was necessary in order to prevent serious inconvenience and interruption to traffic, especially as tracks of both gauges could not be kept by laying a third rail, as was done on the Erie, permitting the wearing out of the old rolling stock. That so extensive a change has been effected in so complete a manner, with entire absence of delay or mishaps, is exceedingly creditable to the managers of the southern roads, and to their subordinates intrusted with the execution of the work.

As we have already noted, the standard adopted by the Southern lines is the Pennsylvania gauge of 4 ft. 9 in. This is now the universal gauge south of the Potomac, except in the case of the Illinois Central, the Mobile & Ohio and the Cincinnati, New Orleans & Texas Pacific, whose managers preferred the 4 ft. 8½ in., which is the more general standard.

In a great many of the foreclosures and reorganization proceedings which have been instituted during the past two years complaint has been made that the interests of the bondholders, who supposed that they had prior liens upon the property, have been subordinated to those of the floating-debt creditors, and that the courts have been inclined to unduly favor that class of creditors in the appointment of receivers and in other respects. The recent decision of the United States Circuit Court for Texas, in the Houston and Texas Central case, indicates that that court is not inclined to follow up the practice complained of, and should the decision be sustained by the United States Supreme Court on the appeal which has been taken, it will constitute an important precedent in favor of bondholders. In this case a majority interest in the stock of the road under reorganization was owned by the Southern Development Company, a corporation allied to the Southern Pacific Company, and under its control. This Southern Development Company procured the appointment of a receiver in a suit to recover money advanced to pay interest, the cost of rails for renewals, and to meet other current liabilities, and in the usual course of things the receivers proceeded to apply the earnings of the road to the payment of floating-debt claims and improvements of the road. At the same time the directors of the company submitted a proposition to the bondholders, asking them to accept reduced interest until the maturity of their bonds, and to make other concessions. The bondholders, believing that the road could be made to earn its interest, at any rate on the first mortgage, rejected this proposition, and instructed their trustees to begin proceedings against the company, which had defaulted upon the coupons. The trustees obeyed instructions, and began their proceedings by filing a demurrer in the suit in which the receivers were appointed. This demurrer the Circuit Court has now sustained, and has dismissed the suit of the Southern Development Company, holding that its claim does not give it any lien upon the earnings of the road prior to that of the bondholders, and this action has been followed up by an order constituting a new receivership in the interest of the bondholders. Should this decision be sustained, it will establish the law that holders of bonds are entitled to that prior claim upon a railroad and upon its earnings to which their securities nominally give them a right, which has in too many cases been disregarded. This will not, however, affect the prior lien upon the earnings of a road which has been in all cases allowed to claims for labor and supplies furnished, and for the current expenses for operating the line while under the control of the court.

April earnings are reported this week by nine railroads, including some of the most important. The Erie's earnings we have examined elsewhere. Against its considerable gain in gross and large gain in net earnings, the Reading has a considerable decrease in gross and a large one in net, as follows:

	1883.	1884	1885.	1886.
Gross	$1,726,617	$2,855,673	$2,343,973	$2,177,972
Net	755,428	1,304,161	951,318	742,526

The first of these years was before the lease of the Central of New Jersey; yet we see that the net earnings were larger then than this year, and that this year they are 22 per cent. less than last year and 43 per cent. less than in 1884. It is not probable that this reflects the general course of earnings of the anthracite roads; in fact, the Pennsylvania and the Erie are among the largest carriers of anthracite, and they made gains in April.

The New York & New England continues its remarkable gain in earnings, they having been in April:

1882.	1883.	1884.	1885.	1886.
$261,044	$275,891	$275,507	$262,102	$314,504

Thus this year the earnings are not only 20 per cent. more than last year, but they are more than ever before. This, however, is trifling in comparison with the gain in net earnings, which have risen from $36,220 in 1884 to $72,237 in 1885 and $106,057 this year—a gain of 193 per cent. since 1884 and 47 per cent. since last year. It makes quite a respectable figure among New England roads now, with $819 gross and $276 net per mile.

The Ohio & Mississippi, which should be gaining from the higher through rates, but suffered from the troubles at East St. Louis, has earned gross in April:

1882.	1883.	1884.	1885.	1886.
$296,712	$316,882	$306,476	$288,964	$270,198

Thus the earnings have decreased continually since 1883. The net earnings were 11 per cent. less this year than last. The nine roads reporting this week have a gain in the aggregate of 4¼ per cent., the chief gains being 18 per cent. by the Erie, 20¾ by the New York, Pennsylvania & Ohio, 25 by the Memphis & Charleston and also by the St. Joseph & Grand Island.

We have now had reports for April from 80 railroads, whose aggregate earnings were:

	1886.	1885.	Increase.	P.c.
Earnings	$27,763,490	$27,111,844	$664,646	2.4

Last year our table for April had reports from 79 railroads, and their earnings then were $2,095,761 less than in 1884, which was not a particularly favorable year.

Erie Earnings in April.

The gross and net earnings of the New York, Lake Erie & Western Railroad in April were somewhat less than in March, as is frequently the case, but they were much larger than in the corresponding month of last year, and somewhat larger than the year before. For the month of April the gross and net earnings of the Erie proper, excluding the leased New York, Pennsylvania & Ohio road, have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1878	$1,127,079	$891,755	$235,324
1879	1,372,755	964,455	408,300
1880	1,643,151	962,827	680,324
1881	1,709,057	1,117,689	591,368
1882	1,670,743	1,001,725	669,018
1883	1,548,474	1,079,503	468,971
1884	1,397,726	958,377	439,349
1885	1,201,648	905,842	295,846
1886	1,498,702	964,402	464,300

Compared with last year the increases are:

	Gross earnings.	Expenses.	Net earnings.
Amount	$217,054	$58,560	$158,494
Per cent	18.1	6 5	53.6

The percentage of increase in gross earnings is very large, and in net earnings enormous, but the results last year were so wretched that the amount this year cannot be called large. Compared with 1884 the gain is but 1½ per cent. in gross and 3¼ per cent. in net earnings, and compared with any of the four years from 1880 to 1883 there is a decrease which is very large for three of the years. Thus the net earnings this year, while $158,494 more than last year, were $214,718 less than in 1883, and $226,024 less than in 1880.

Meanwhile the earnings and expenses of the leased New York, Pennsylvania & Ohio road in April since the lease have been:

	1884.	1885.	1886.
Gross earnings	$484,865	$393,182	$474,491
Expenses	376,592	294,156	310,021
Net earnings	$108,273	$99,026	$164,470
Rental	155,157	125,819	151,837
Profit			$12,633
Loss	$46,884	$23,793	

The gross earnings of this road in April were never so large before the lease as they were last April, except in 1881; nor were the net earnings reported then ever so large as this year; but as the expenses are reported differently now, not much stress can be placed on that.

Subtracting the loss and adding the profit on this lease to the net earnings of the Erie proper, we have, for the last three years:

1884.	1885.	1886
$392,465	$272,053	$468,933

which should be compared with the net earnings of the Erie proper in years previous to 1884. The gain over last year is 72 per cent. and over 1884 19 per cent., and the amount is very nearly the same as in 1883, but much less than for three years previous.

For the seven months of its fiscal year ending with April, the earnings and expenses of the Erie proper have been:

	Gross earnings.	Expenses.	Net earnings.
1877-78	$9,271,136	$6,379,018	$2,892,118
1878-79	9,144,777	6,422,952	2,721,825
1879-80	10,464,485	6,725,142	3,739,343
1880-81	11,849,557	7,752,839	4,096,718
1881-82	10,963,673	7,700,841	3,262,832
1882-83	11,383,165	8,026 528	3,356,637
1883-84	10,303,923	7,375,168	2,928,755
1884-85	8,806,509	6,280 302	2,525,206
1885-86	10,085,554	6,684,092	3,401,462

Thus the gross earnings this year, though much larger than last year, were less than in any other since 1878-79, and the same may be said of the working expenses, while the net earnings were larger this year than in any other since 1880-81, and were exceeded only in 1880 and 1881—a very remarkable result in view of the circumstances. It is due, of course, to the reduction in expenses, which were but 66¼ per cent. of the earnings this year, as against 71⅓ last year, and 71½ in 1884. This indicates that better average rates have been received this year, which is known to have been the case for through freight, compared with last year. The increases in earnings and expenses for the seven months, compared with that year, have been:

	Gross earnings.	Expenses.	Net earnings.
Amount	$1,279,045	$403,791	$875,254
Per cent	14.5	6.4	34.7

Meanwhile the earnings and expenses of the leased New York, Pennsylvania & Ohio road for the seven months have been:

	1883-84.	1884-85.	1885-86.
Gross earnings	$3,526,993	$3,028,931	$3,379,666
Expenses	2,625,232	2,080,255	2,278,710
Net earnings	$901,761	$948,676	$1,100,956
Rental	1,128,358	969,258	1,081,493
Profit			$19,463
Loss	$226,597	$20,582	

Thus, compared with last year, the road has gained 11⅓ per cent. in gross and 16 per cent. in net earnings, and there is a slight profit on the lease, against a slight loss last year and a large loss the year before. Subtracting the losses from and adding the profits to the net earnings of the Erie proper, we have:

1883-84.	1884-85.	1885-86.
$2,702,158	$2,505,625	$3,420,925

which should be compared with the net earnings of the Erie proper in years previous to 1884. The gain of $915,300 over last year is equal to nearly one-fifth of the profits of the whole of that year. At this rate, the gain for the whole fiscal year over last year should be $2,033,668. As, however, the decline from previous months was not so great in the last five months as in the last seven months of first year, this, perhaps, is too much to expect. The net earnings and loss on profit on the leased Ohio road have been for the five months from May to September, inclusive:

1881.	1882.	1883.	1884.	1885.
$3,362,657	$3,624,849	$4,001,026	$2,577,200	$2,081,431

The profits in 1883 were phenomenally large in this period,

and unnaturally so, the road having taken an extraordinary large proportion of the east-bound traffic after the lease of the Ohio road (beginning May 1 of that year) and the opening of the Chicago & Atlantic, so much so that profits amounting to $1,100,000 in August and $1,037,000 in September were reported, which was $578,000 (37 per cent.) more than the largest ever made in those two months before. The prospect is not particularly favorable for traffic now, but it is entirely possible that the profits of the five months to Sept. 30 next will be very much larger than in the corresponding period of 1885 and 1884.

Crops.

The May report of the Department of Agriculture gives a high average condition of winter wheat—94.9 of a general good condition, against 70 last year, 94 in 1884, and 83½ in 1883. The largest crop was in 1884. The area *sown* was about 24,727,000 acres, against 28,346,000 in 1884 and 25,304,000 last year; but last year about 3,156,000 acres sown were winter-killed and not harvested, and this year there is very little wheat winter-killed except in Kansas and Michigan, and not much is plowed up there, so that the area to be harvested will probably be nearly 11 per cent. greater this year than last. The acreage April 1 this year, compared with the acreage *harvested* last year, and the average condition May 1 in the chief winter wheat states, have been :

	Acres.		Condition.	
	1886.	1885.	1886.	1885.
Middle states	2,951,129	2,830,343	96	80
South	5,467,676	5,572,386	92	65
Ohio	2,585,056	2,018,952	97	59
Michigan	1,732,732	1,623,929	91	100
Indiana	2,366,806	2,518,455	98	70
Illinois	2,135,039	1,255,905	92	42
Missouri	1,976,146	1,517,598	101	60
Kansas	1,531,849	1,060,250	67	62
California	2,993,760	2,822,400	99	78
Oregon	884,692	876,102	103	101

The great gains shown this year in Ohio, Illinois, Missouri and Kansas are wholly due to the abandonment at harvest last year of wheat sown. Thus the acres *sown* in these states were :

	Ohio.	Illinois.	Missouri.	Kansas
1886	2,585,056	2,135,039	1,976,146	1,531,849
1885	2,611,178	2,511,810	2,147,985	1,823,630

So that these four states together sowed 8,228,090 acres this year against 9,094,603 sowed last year, when, however, they harvested but 5,852,705, nearly the whole of the winter-killed acreage having been in them. They sowed this year 9½ per cent. less than they sowed last year, but 40 per cent. more than they harvested then. The present acreage and condition promise a crop of about 322,000,000 bushels, against 212,000,000 bushels last year. The price of wheat was so low last year, in spite of the failure of our crop, that it seems to be generally believed that if the crop had not failed the country would have been worse off. This may be with the Nebraska, Dakota and Washington and Indian growers of spring wheat, but hardly with the Illinois growers, who did not harvest half the area they sowed, and we may be sure that a good crop this year will be a good thing, whatever the price may be. It will not be well for us to have the shortage occur in this country which makes high prices. The failure last year was a great misfortune for Kansas, Missouri, Illinois and Ohio. There is a decrease in the acreage sown everywhere except in Oregon, and there the increase is very small. The Department seems to report the wheat grown in Eastern Oregon as winter wheat, while we believe it is all spring wheat, sown very early, however. The wheat in the Willamette Valley is nearly all winter wheat, but the production of Eastern Oregon is probably the greater now.

Cotton planting was a little late, there being more to plant in May than usual. The weather has been too wet and cool to give the plant the start desirable.

Corn planting was earlier than usual in the great corn-growing states, but there is complaint of too much rain, and much may have to be planted over. There must be a considerable increase in the area planted, wheat giving way for corn, though the extension of grass land is greater still.

Spring wheat was sowed earlier than usual in Dakota, and early sowing is likely to be of great advantage there, where late-sown wheat frequently suffers from drought. There was drought this year—in May, but at the last moment heavy rains came, and the prospect seems fair.

The Railroads of the World.

The *Archiv fur Eisenbahnwesen* gives statistics of the railroads of the world, prepared for the most part from official sources, making the aggregate length at the end of 1884 290,750 miles, of which no less than 62,788 miles have been opened since 1879. Of this there were in the several grand divisions of the world :

	1884.	1880.	Increase.	P.c.
Europe	117,694	104,606	13,088	12.5
Asia	12,757	9,905	2,852	28.8
Africa	4,075	2,842	1,233	43.4
America	148,758	105,766	42 972	40.6
Australia	7,486	4,844	2,642	54.5

In 1880 America had very little more railroad than Europe; four years later it had 31,044 miles (26 per cent. more than Europe, and of the total increase of 62,788 miles in these four years more than two-thirds (68½ per cent.) was in America. The vast territory of Asia has as yet only about as much railroad as the single state of Illinois, and seven-eighths of that is in the English dependency, India. This quarter of the globe contains more than half of its population, and there can hardly be a doubt that in time it will have to be provided with a railroad system, though experience in India shows that the combination of a large and industrious population with a great extent of fertile soil will not always supply a traffic for a great network of railroads. There are there no less than 21,643 inhabitants per mile of railroad, against 458 here; yet such of the Indian railroads as are prosperous have made their way slowly, and great deliberation needs to be exercised in making new lines.

About two-fifths of the African railroad mileage is in the British colonies in South Africa, 29 per cent. is in the French colony of Algiers, and 23 per cent. in Egypt, all very near the north and south coasts, leaving the vast interior without any.

Proportionally the greatest rate of increase since 1880 has been in Australia, but its mileage is still small, as is its population. In Europe nearly one-fourth of the railroad built since 1880 is in France, which has increased its mileage 3,121 miles, or 19.2 per cent., in the four years. In proportion to population it has now a larger mileage than any other European country except Sweden, Switzerland, Denmark and Great Britain and Ireland. In proportion to area it is behind Belgium, Great Britain and Ireland, Holland, Germany and Switzerland. Next to France the largest additions were made in Austria-Hungary—2,096 miles, or 18.3 per cent., closely followed by Germany with 2,055 miles (9 per cent.). More than half the total increase in Europe was in these three countries, but the *rate* of gain was greatest in Greece—1,491 per cent.—due to adding to the 7 miles from Athens to Piræus 102 other miles. The European countries which need railroads most are probably the Danube provinces, Austria-Hungary and Russia. That is, these countries have a capacity for production which new railroads would make it possible to utilize to great advantage; it does not follow that the Bosnians, Serbs, Bulgarians, Hungarians and Russians would make use of their natural advantages if they had railroads. Some of them make very poor use of what railroads they already have. Russia, which has but one mile of railroad to 52,500 inhabitants, added but 1,192 miles (8 per cent.) to its railroad system in these four years.

In America there were but 15,185 miles of railroad outside of the United States at the end of 1880, and this had increased by the end of 1884 8,252 miles, or 54⅓ per cent., to 23,437 miles. Mexico gained most, but Canada was close behind. Elsewhere in America the new construction amounted to but 3,320 miles, of which 1,810 miles were in Brazil and 1,106 miles in the Argentine republic. In South America altogether there were but 9,515 miles of railroad at the end of 1884, 3,071 miles of which had been opened since 1880, an increase of nearly 50 per cent. There is plenty of room there for railroads, if room is all that is wanted.

Calculation shows that of the 290,750 miles of railroad in the world, no less than 174,016, or 60 per cent., are in English speaking countries. The countries which have the greatest mileage in proportion to population, or the smallest number of inhabitants per mile, are Australia (364 people per mile), the United States (460) and Canada (486). Even the Argentine Republic has a smaller population per mile than any European country—namely, 1,000, while in Europe, Sweden, which has fewest, has 1,113; Great Britain and Ireland, 1,870; Germany, 1,983; France, 1,943; Belgium, 2,106; Austria-Hungary, 2,786.

The cost of railroads, as is well known, has been greatest in Great Britain, being there $205,842 per mile of roads; for the Belgian State Railroads it is $123,986; for the French railroads, $124,642; for the German State Railroads, $105,204; for the German private roads, $71,877; for the Austro-Hungarian roads, $104,420. The cheapest system of Europe is the State Railroads of Finland, $30,102; the other Russian railroads stand at $82,244, against $63,250 per mile for the railroads of the United States.

The whole cost of the railroads of the world has been more than $24,000,000,000, which, however, is only about $24 per inhabitant. In this country the expenditure has been about $133 per inhabitant; in Great Britain, $107; in Germany, $47; in France, $57; in Austria-Hungary, $33; in Italy, $19; in Belgium, $41; in Sweden, $25; in Spain, $29; in Russia, $14; in Canada, $89.

Continuous Brakes in England.

The Board of Trade Returns just issued show the following results of the working of continuous brakes in England during the six months ending Dec. 31, 1885. The "faults" or failures include all reported cases of trains being delayed by brake out of order or failures of a brake to stop a train when required. Only about 5 per cent. of the failures come under the latter category:

Brake.	No. of train miles run.	No. of faults.	Mileage per fault.
Westinghouse automatic	19,378,261	706	27,448
Automatic vacuum	14,765,909*	173	85,352
Clark & Webb's (chain)	890,088	1	890,088
Total automatic	35,034,258*	880	39,811
Clark & Webb's (chain)	4,082,387	20	204,119
Simple vacuum	17,817,959	109	163,467
Westinghouse (non-automatic)	797,624	None.	.....
Total non-automatic	22,697,970	137	165,683

In the above, figures relating to some brakes in very limited use are omitted. The figures marked * do not include about 1,200,000 miles run with the automatic vacuum brake on the Lancashire & Yorkshire, where 265 engines and 1,324 carriages are fitted, but exact mileage cannot be given.

The following figures represent the percentage of the total passenger train mileage run with continuous brakes during the first six months of 1885:

	Per cent.
England and Wales	83†
Scotland	76
Ireland	56
United Kingdom	81†

†Exclusive of one large and several small companies which could not supply exact mileage.

It appears that the great majority of main line trains are being worked with continuous brakes, and that only a few minor lines have less than 40 per cent. of their trains fitted. The preferences of the twenty principal lines appears to be as follows :

Westinghouse automatic	6 lines.
Automatic vacuum	4 "
Simple vacuum	7 "
Automatic chain	1 "
Westinghouse simple	1 "
Undecided	1 "
	20 "

The simple or non-automatic vacuum brakes resemble only in principle the earliest form, the Smith vacuum brake, used in this country, and which now survives only on the Long Island Railroad. As used in England, all the details have been much modified, and in some forms a small ejector constantly at work maintains a slight vacuum sufficient to show on a gauge, but not sufficient to cause the brakes to go on. If the train parts or the hose becomes uncoupled, this slight vacuum is destroyed, and the gauges on the engine and train show "danger," warning those in charge that the brake power is seriously impaired. In another, the invention of Mr. Webb, and largely used on the London & Northwestern, it is claimed that the rear part of the train can be stopped in the event of a runaway. The automatic vacuum brakes are made in various forms, but all use the same coupling, and can, therefore, be worked together. A small ball check valve performs the functions of the triple valve, and one end of the brake cylinder serves as an auxiliary reservoir. The construction is simple, but somewhat bulky.

The American Brake Co. has completed its arrangements for the coming competitive brake tests to be held at Burlington, Ia., July 13, having closed a contract with the Missouri Car & Foundry Company, of St. Louis, for fifty new 34-ft. 40,000 lb. box cars for use in the tests. It will also furnish its own engine equipped with its steam driver and tender brake. This goes far toward insuring that pretty thorough competitive tests of all the power brakes of any considerable prominence will actually be held, and should make the results of the greatest interest and value.

The rail and canal shipments of grain from Buffalo since the canal opened have been :

	Week ending			
	May 1.	May 8.	May 15.	May 22.
By rail	481,142	405,672	615,600	1,290,414
By canal	845,585	1,849,284	1,439,246	1,909,832
Total	1,326,727	2,254,956	2,054,846	3,200,246
P. c. by rail	36.3	18.0	30 0	40.3

The canal was open but a small part of the first of these weeks, and to this may be due the large proportion of the shipments by rail in that week; the next week it seemed as if the canal boats would leave little for the railroads to carry, but in the last two weeks the railroads have carried a very large share of the grain, and in the last week a large quantity as well as a large share. The canal boats apparently are getting all they can do, the rates being very profitable for them, and the railroads are getting the overflow. The indications are that there are not boats enough to carry as much as used to be common canal shipments. Thus, at the above rate, the shipments would be about 6,800,000 bushels per month; while the New York canal receipts until 1881 had often been more than 10,000,000 bushels in a month—in 1877, 10,300,000 in October and 12,000,000 in November; in 1878 10½ millions in May, 10 in September, 14 in October and 10 in November; in 1879 10 in September, 12 in October, and 12 in November, and in 1880 11 in June and July, 10½ in September, and 11½ in October. But since 1880 there have been no such large receipts by canal, and for the several seasons they have been :

Year.	Bushels.	Year.	Bushels.
1880	69,440,910	1883	41,220,908
1881	38,192,730	1884	37,925,257
1882	32,150,406	1885	29,930,587

The season varies from 27 to 31 weeks, and to make the maximum of any month heretofore (14,000,000 bushels) they should be more than 3,100,000 per week, and to make 10,000,000 per month they must be 2,222,000 per week, which is a seventh more than in any week so far this year.

The Northern Pacific made its large increase in gross earnings last April ($115,818 = 13.2 per cent.) with but a small increase in working expenses ($30,657 = 6 per cent.), so that the increase in net earnings was no less than $85,161, or 21⅛ per cent. For the ten months of the company's fiscal year ending with April the earnings, expenses and prior charges have been :

	1885-86.	1884-85.	Inc. or Dec.	P. c.
Gross earnings	$9,669,438	$9,320,542	+ $348,896	3 8
Expenses	4,921,891	5,043,236	— 121,345	2 4
Net earnings	$4,747,547	$4,277,306	+ $470,241	11.0
Charges	4,970,929	4,445,861	+ 525,068	11.8
Deficit	$223,382	$168,555	+ $54,827	32.5

The small gain in gross earnings, together with the small reduction in working expenses, make the large gain of 11 per cent. in net earnings, which is a little less than the increase in interest and other prior charges, which this year as well as last have slightly exceeded the net earnings. May and June usually yield larger net earnings than April, but this year the very low through rates have caused the people of the Pacific coast to lay in stocks for several months, and whatever may happen to rates this traffic is likely to be unusually light for a time at a season when it is usually considerable, and this may reduce the May and June profits, so that it seems likely that the company's net earnings from its railroad will not quite meet its interest, rentals, etc.

Mr. Thomas Colden Ruggles, of Yonkers, an old engineer, who many years ago made a reputation in the construction of the Virginia Central Railroad (now Chesapeake & Ohio

over the Blue Ridge, and in similar works, and has given special attention to the improvement of the Erie Canal, has written a letter on that subject, which has been published by the Union for the Improvement of the Canals of New York, in which he urges, as he has done before, the advantages of an increase in the depth of the canal. Mr. Ruggles has made trips through the canal, sounding, and he argues that a very great advantage is had by having more water *under the boat*. He found that with a steam canal boat one ton of fuel carried it 49 miles on the 7 ft. canal and 81 miles on the Hudson, and that practically the resistance was about the same with 3 ft. as with a greater depth of water under the boat. With 10 ft. of water he claims that a steam canal boat would make 12 trips in the season, and he estimates the cost per ton between Buffalo and New York at different depths as follows:

	7 ft.	9 ft.	10 ft.
Down	$0.74	$0.53	$0.49
Up	1.53	1.10	1.00
Trips per season	8	10	12
Tons capacity	5,520	8,300	10,380

The rates on the canal have been so low for the past two years that it hardly seemed worth while to aim at lowering them; but with the railroad rates on a profitable basis, as now, they amount to an appreciable sum, having been 5¼ to 6¼ cents a bushel for wheat from Buffalo to New York so far this season. This still leaves it the cheapest route from the West to the seaboard. The cost by a 10 ft. canal, as estimated by Mr. Ruggles, is 1½ cents per bushel, which is as low as the lowest lake rate from Chicago to Buffalo, and something like 3 cents less than the average canal rates since tolls were abolished. In the largest grain business the canal has had in any year this difference would amount to $2,100,000. For several years past the whole grain business to the seaboard, canal and rail, has been much less than then, and the exports, which alone the low canal rates could divert from other ports to New York, have fallen off very largely, though average transportation rates have been reduced several times 3 cents a bushel. Progress in this direction must always be made by steps, however, and grain is not the only freight the canal carries, and with *quicker* transportation it could doubtless command some merchandise which now goes by rail.

Short branch lines, unless built to reach some special source of traffic such as a coal mine, are often not profitable by themselves, however well they may pay as feeders to a main line. An exception to the general rule is found in the Stewartstown Railroad in Pennsylvania, whose first report is published elsewhere. This road, which connects with the Northern Central, is seven miles long, running through a hilly but rich agricultural country. It serves a purely farming community, and was built by the farmers on the line for their own accommodation. It is of standard gauge, has been fairly well built, is laid with 50-lb. steel rails and partly ballasted with stone. With an equipment of one locomotive, passenger and service cars (freight cars being furnished by the connecting line), it has cost in all $71,621, or $10,232 per mile. The road was opened in September last, and for the 6½ months of its operation to March 31 the net earnings were $342 per mile, or about 3¼ per cent. on the cost. Should the business continue at the same rate for the rest of the year, and the expenses as low, the road will earn in its first year 6 per cent on its cost. Clearly this is not a case where a railroad was built before it was needed. The character of the business is plainly shown by the report, the tonnage in one direction consisting of grain, potatoes, tobacco, live-stock and some lumber, while the return freight was made up of coal, fertilizers and general merchandise. The quantity of fertilizers, about one-fifth of the whole tonnage, shows that the patrons of the road are thrifty farmers, who do not mean to let their land run down, while the merchandise shipments indicate that they are prosperous and able to buy of the outside world.

A correspondent asks whether the general impression, that hewed ties last longer than sawed ones, is well founded. We share this "general impression," but know of no definite evidence by which it can be substantiated. Perhaps a large part of the prejudice against sawed ties comes from the fact that the timber in them is poorer. A hewn tie is usually from a stick which is just large enough to make a good tie when flattened on each side. A sawed tie, on the contrary, is very often cut from large logs making two, three or four ties in each length. Consequently the timber is more apt to be unsound and the faces not parallel with the grain. Whether there is any evidence that, with all other things equal, the mere difference of surface resulting from sawing or hewing has an appreciable effect we cannot say. As depreciation begins under the rail it seems possible that the difference is chiefly imaginary.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Chicago, Burlington & Quincy.—A branch of the *Burlington & Missouri River* is completed from Fairmont, Neb., to Geneva, 8 miles.

Chicago & Northwestern.—A branch is completed from Winona Junction, Wis., to La Crosse, 9 miles.

Fremont, Elkhorn & Missouri Valley.—Extended from Chadron, Neb., west 30 miles. The *Black Hills Branch* is extended from Buffalo Gap, Dak., northwest 12 miles.

Gulf, Colorado & Santa Fe.—Extended from Fort Worth, Tex., north 5 miles.

Joliet, Aurora & Northern.—Track is laid from Joliet, Ill., northwest to Plainfield, 11 miles.

Marshall, Paris & Northwestern.—Extended from Hayward, Tex., northwest to Brushy Creek, 5 miles.

Milwaukee & Northern.—Extended from Pike, Wis., north 4 miles.

Pittsboro.—Track laid from Moncure, N. C., west 3 miles.

This is a total of 87 miles on 8 lines, making in all 940 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

	Miles.		Miles.		Miles.
1886	940	1881	1,574	1876	628
1885	599	1880	1,590	1875	296
1884	910	1879	661	1874	537
1883	1,654	1878	413	1873	1,171
1882	3,323	1877	570	1872	1,797

These figures include *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

Track: a complete Manual of Maintenance of Way, according to the latest and best practice of leading American Railroads. By W. B. Parsons, Jr., C. E. Engineering News Publishing Co., New York.

An author and a publisher who are capable of publishing such a book as this, without even an apology for an index, have little claim upon the clemency of any one, but perhaps—although this may be disputed—their right to justice is not extinguished, and it is but just to say that this is in many ways the most complete and the most useful treatise on maintenance of way which has appeared. Its salient feature, which instantly strikes the atttention, is the abundance and excellence of the illustrations. There are in all 123 different maintenance of way appliances and details, fully illustrated by what are almost working drawings, with full dimensions and weights or sizes given, so that the construction is very clear. This alone is an admirable feature, which should make the volume very useful to many, for even those most familiar with the devices find it convenient occasionally to be able to refer to scale drawings. Very singularly, the one important detail of track which is not fairly illustrated is the most important one of all—rail-sections. Not a single rail-section is given to scale, and the only sections given at all are three little sketches showing the difference between double-headed, pear-shaped and modern rail-sections. The disputed points as to rail-sections, whether the corner should be to a large radius or a small radius, whether the base and stem should be thick or thin, etc., are not even touched upon.

In fact, the purpose of the volume is only to a very limited extent to discuss disputed points, but rather to state the facts and leave every one to draw his own conclusions, although the author shows no undue hesitation in expressing an opinion when he has one and the occasion seems to require giving it; and this perhaps is as it should be, although we note with some surprise that the facts collected by this journal a year or two ago as to nut locks, even and broken joints and cross-ties, are not included.

The book opens with an excellent chapter on track tools, full of practical details. In the article on ties the distinction drawn between cutting and rotting is, we think, too marked, both being merely different forms of the same thing, and the plea that "a variation of *over one inch* from the adopted length should not be permitted" seems to us to put it very meekly indeed. Why should they not be "exactly" to proper length, as on the Pennsylvania and other railroads? It costs no more to cut a tie off in one place than another, and it is just as easy to come within ¼ in. of the stated length as within one inch, if it is only insisted on, while the difference in the appearance of the track is very great. The latest facts as to preserving ties are briefly given, but without the credit which might well have been given to Mr. O. Chanute's report. Road-bed cross-sections are well discussed and illustrated.

In joints the writer gives the preference to suspended joints, speaks favorably of the Fisher, and apprehensively of the success of the long three-tie joint, for the very strong reasons that it will be impossible to make all three ties work together, and if the middle tie or either of the end ties gets low, the strain on the angle-bars is very severe.

The chapters on frogs and switches are also excellent and practical, and give all the leading forms clearly. Some brief discussion of the simple theory of turn-out curves might have been well, but is omitted, tables only being given. Fences, gates, cattle-guards, signs, bumpers and mail cranes are well shown. Tool-houses and buildings are not, perhaps, shown quite as elaborately as might be desired, but as we recall no other book in which they are shown at all, complaint would be ungracious. The question of super-elevation is also clearly discussed. As a whole the book is a good one, if not ideally perfect.

TECHNICAL.

Locomotive Building.

The Taunton Locomotive Works in Taunton, Mass., last week delivered a heavy freight engine to the Old Colony Railroad.

The Pittsburgh Locomotive Works have several orders for locomotives for southern roads.

The Tanner & Delaney Engine Co. in Richmond, Va., has orders for pole-road locomotives for Florida, Alabama, South Carolina and Mississippi, and has lately received one from South America.

H. K. Porter & Co. in Pittsburgh last week shipped two light locomotives to Savannah.

The Strong Locomotive Co. has been organized to manufacture locomotives and appliances for locomotives under the patents of Mr. George S. Strong. The office of the company is at Glen Ridge, Essex County, N. J.; the incorporators are: Thomas F. Rowland, George D. McCrearey, Chas. G. Worthington, A. G. Darwin, Henry G. Morris and George S. Strong.

The Car Shops.

The Boston & Maine shops in Lawrence, Mass., have just completed two new parlor cars for the road. They are 60 ft. long and are mounted on M. C. B. standard trucks, having 42 in. Allen paper wheels. Inside the finish is mahogany, with birds-eye maple bead lining, the chandeliers, baskets and other metal work being burnished brass, while beveled French plate mirrors add to the handsome appearance. At one end is the ladies' retiring room on one side of the entrance and the steam heater on the other. The main parlor is some 45 ft. long, is carpeted with an axminster of neat design and colors, and has 26 comfortable revolving chairs upholstered in crimson plush. There are 13 windows on each side, every alternate one being nearly double the width of the intermediate ones. A convenient smoking room, entirely separate from the main apartment, contains two chairs and a sofa, furnishing seats for six gentlemen. In addition to the usual bell cord, the car is equipped with the Judkins (electric) train signal, which is already in use on all the passenger locomotives and cars of this road.

The Illinois Central shops in Chicago have completed an order for 125 box cars for the road. These cars are 35 ft. long, are mounted on 36-in. wheels and the axles have 4 by 7 in. journals. The Southern Division shops at McComb City and Water Valley, Miss., are building 175 more of the same class.

The Peninsular Car Works in Detroit have resumed work, the strike of the employés having failed.

Attachments to the amount of $50,000 have been issued against the Lehigh Car Works at Stemton, Pa., at suit of the Allentown (Pa.) National Bank. The trouble is caused by the Failure of H. H. Fisher, of Allentown. The liabilities of the company are said to be about $125,000.

The Barney & Smith Manufacturing Co. in Dayton, O., are completing an order for 18 passenger cars for the New York Central & Hudson River Railroad. These cars are of the latest design, with many modern improvements, and are mounted on Krupp steel-tired wheels.

The St. Charles Car Co. in St. Charles, Mo., has taken a contract for 50 flat cars for the Kansas City, Fort Scott & Gulf road. The company has just completed a new building 50 by 200 ft., to be used as a passenger car erecting shop, and will undertake the manufacture of passenger cars, a new branch of its business, which has heretofore been confined to the building of freight cars.

The Missouri Car & Foundry Co. in St. Louis has taken a contract for 100 refrigerator cars for the Missouri Pacific road.

The Fitchburg Railroad shops in Boston are just completing 4 combination baggage and smoking cars. The cars are 56 ft. long and have a baggage compartment of 10 ft. in length. The smoking rooms have seats for 58 persons, and are handsomely finished.

Car Couplers.

The Massachusetts Railroad Commissioners will give hearings at their office, No. 20 Beacon street, Boston, on Friday, June 11, and Friday, July 9, at 10 a. m., on the merits of safety couplers for freight cars, to decide whether any such couplers shall be added to the list prescribed for use in Massachusetts. After each hearing the Commission will witness practical tests, if such shall be offered at some of the freight yards in Boston. No coupler will be considered unless it has been used in actual traffic.

Bridge Notes.

The Morse Bridge Co. in Youngstown, O., has taken a contract to build 3 highway bridges in Taunton, Mass., and neighborhood.

The H. S. Hopkins Bridge Co. in St. Louis is at work on a contract for all the bridges on the San Antonio & Aransas Pass road. This contract includes 2 spans of 150 ft. each over Calaveras Creek; 1 of 150 ft. over the Salado River; 1 of 200 ft. over the San Antonio River, and draw-span of 250 ft. at Aransas Pass, and several smaller bridges.

The St. Louis Bridge & Iron Co. has just completed an iron bridge with 3 spans of 160 ft. each over the Meramec River in St. Louis County, Mo., and a highway bridge of 126 ft. span at Mascoutah, Ill. The company has contracts for two large iron bridges for Boone County, Mo., and several smaller bridges.

Iron and Steel.

Graff, Bennett & Co. in Pittsburgh are running their three rolling mills full double turn, and are turning out more work than at any time for three years past.

Two of the large blast furnaces of the Reading iron works in Reading, Pa., which have been idle for about a year, have been repaired and put in readiness to resume work. The first one is to be started up this week and the second about the end of the month.

The steel mill of Oliver Brothers & Phillips in Pittsburg has been put on three turns of 8 hours each on account of a pressure of orders.

No. 5 furnace of the Crane Iron Co. at Catasauqua, Pa., has gone out of blast for repairs.

The American Tube & Iron Co. has taken a heavy contract for 8 in. and 10 in. iron pipe for the Ohio Gas Fuel Co. The pipe is to be laid from Youngstown, O., to the Pennsylvania line.

Manufacturing and Business.

The United States Car & Axle Co. has been incorporated at Covington, Ky., with $500,000 capital stock, to manufacture and sell railroad appliances and supplies. The incorporators are Charles P. Holmes, H. Davis and Charles D. Mills.

The Hartford Tool Co. in Hartford, Conn., has sold its business to the Pratt & Whitney Co. of that city. That company will continue the business under charge of Mr. J. G. Woodbridge.

The Brown Hoisting & Conveying Machine Co. in Cleveland, O., has sold a cable tramway plant of 370 ft. span to the Aurora Mining Co. in the Gogebic iron district in Wisconsin.

The Rail Market.

Steel Rails.—The demand is still active and quotations are steady at $34.50@$35 per ton at eastern mills, for summer delivery, although it is reported that some concessions have been made on large orders for late fall and winter. No change in price is expected as any considerable increase would permit the sale of English rails at prices which will compete with American. Makers say that the orders recently placed for English rails, to be delivered at New Orleans and Galveston, do not effect trade which can readily be supplied from eastern mills or which requires any considerable transportation of rails by land.

Rail Fastenings.—Quotations are steady at 2.40 cents per lb. in Pittsburgh for spikes; 2.75@3.10 for track-bolts, and 1.65@1.80 for splice-bars. An active demand is reported.

Old Rails.—The market for old iron rails is dull, with sales of small lots only at prices varying from $18.50@$20.50 per ton at tide water. Old steel rails are higher and are quoted at $21@$22.50 per ton in Pittsburgh.

The Preservation of Ties.

The Union Pacific Co. has commenced work on a tie-preserving plant in Laramie, Wyo., in which the ties to be used on the road will be subjected to the burnetizing process. This plant is one of three owned by railroad companies in the United States, the others being those of the Atchison, Topeka

& Santa Fe, at Las Vegas, N. M., and of the Chicago, Rock Island & Pacific, in Chicago.

The Canadian Pacific Sleeping Cars.

The first of the new sleeping cars which have been built for the through service on the Canadian Pacific Railway have been received at the Dalhousie Square station of the company in Montreal. Some novel features have been introduced which will be appreciated by the traveling public. Chief among these is a bathroom at one end of the car, in which baths can be obtained at a charge of 50 cents at any time during the journey. The first two of the eight cars which have been ordered to commence the service with are named the "Yokohama" and the "Tokio." Instead of the seats used during the day being of the old design, the four centre berths are comfortable lounges, which at night time are drawn out to form berths. The centre of the car is, therefore, a sort of small hall which can be used as a promenade. The head-rests of the other seats are carried much higher, and so arranged as to afford the greatest possible comfort.

At one end is a smoking-room, with lounges instead of ordinary seats, and at the other end is an exceedingly handsome and comfortable drawing-room, fitted with the usual toilet accessories. All the toilet tables are of Parian marble and the fittings of beaten bronze. The cars, like all the new cars on the road, are built of solid mahogany outside, but satinwood, inlaid with brass and mother of pearl, which gives the car a lighter appearance, is used inside. The designs on the ceiling and upper berths are Japanese, and are exceedingly rich. The ventilators are of colored venetian glass of beautiful shades. Heavy curtains are hung over the windows, which open in both upper and lower berths. The upholstery is in sea green plush, and the floors are covered with the finest Turkey carpet. All the windows are large and afford excellent opportunities for viewing the scenery *en route*, while those of the smoking room are arranged as regular observation windows, reaching far down towards the platform. The buffet will be carried on other cars of the train, so that no unpleasant smell from cooking will permeate the sleeper. The cars were built after designs furnished by Vice-President W. C. Van Horne, and are complete in every respect.

There are also six magnificent new dining-cars being built for the service, which will be shortly delivered.—*Toronto (Ont.) Railway Life.*

Railroad Bridge Loads.

Some of the leading English lines of railroad, 4 ft. 8½ in. gauge, reckon in the calculations for the strains the undermentioned as the greatest loads that can be put on iron girder deck under-bridges. In the table, S = span in feet, measured on the skew, if the bridge is on the skew, R = rolling load in tons distributed on each pair of rails:

S.	R.	S.	R.	S.	R.	S.	R.
10	32	33	62	56	85	79	118
11	35	34	63	57	87	80	120
12	34	35	64	58	88	81	121
13	36	36	65	59	90	82	123
14	38	37	66	60	91	83	124
15	40	38	67	61	93	84	125
16	42	39	68	62	94	85	127
17	45	40	69	63	96	86	128
18	47	41	70	64	97	87	129
19	48	42	71	65	98	88	130
20	50	43	72	66	99	89	132
21	51	44	73	67	101	90	133
22	53	45	74	68	102	91	134
23	54	46	75	69	104	92	136
24	55	47	76	70	105	93	137
25	56	48	77	71	106	94	138
26	57	49	78	72	108	95	140
27	57	50	79	73	109	96	141
28	58	51	80	74	111	97	143
29	59	52	81	75	112	98	144
30	59	53	82	76	114	99	145
31	60	54	83	77	115	100	147
32	61	55	84	78	117		

—*Mechanical World.*

A New Foundry Core.

We have just had brought under our notice a new kind of core well adapted for foundry work. This is the carbon core invented and manufactured by Mr. R. Applegarth, of the Atlas Works, Ewer street, Southworth street, London, and which is gradually superseding sand cores in practice. The carbon cores are made of various diameters, and in 10-in. lengths, and are stated by users to make a perfectly smooth hole, and in many instances to save the trouble of boring. They are much stronger than sand cores, never crush or break in the mold, and can easily be punched out, and may often be used a second time. When these cores become known we think they will have a very good run with brass and iron founders.—*Iron.*

The Endurance of Steel Rails.

The following paper on this subject was read by Mr. F. W. Webb at the recent meeting of the (English) Iron and Steel Institute:

As a great many questions have been asked me as to the comparative durability of iron and steel rails, I have thought that the 19 years' results on the London & Northwestern line, which I have been able to tabulate, might be of interest to the members of the Iron and Steel Institute, and I beg to submit a diagram to this meeting showing the comparative numbers of tons of iron and steel rails used for relaying purposes on the railway in question, from 1867 to the end of this year, the last year being, of course, the estimated requirements. On the same diagram I have shown the quantity of coal burned yearly in the locomotives, as I take it that this is the only reliable way in which we can arrive at the amount of work done on the line in each year; and, as a check upon the coal consumption, I have also shown on the diagram a line representing the train-miles along with the engine-miles, and it will be seen at a glance that, while the coal line very closely follows in proportion to the train-miles and the engine miles run in each year, the quantity of rails used for renewals has been a constantly decreasing amount since 1877. From 1868 to 1877, we were putting down both iron and steel rails on renewal account. I have shown the iron and steel rails separately in the diagram, and the combined iron and steel in a double line. In 1868 the quantity of iron and steel rails required for renewals was, roundly, 16,400 tons, and the largest weight of rails required for renewals was arrived at in 1876, twelve months after which iron rails entirely disappeared—the total number of tons used in that year (1876) being 31,391, while the estimated requirements for this year are only 11,600 tons.

Practically, the whole of our main lines are relaid with steel; and while, in past years, we have been putting down steel rails as fast as iron ones wore out, we are now putting down steel rails as fast as steel rails wear out, except on some of our branches, where iron rails, of course, last a much longer time than on the main line. From what I can see, by watching closely our own line, I believe we have now reached the minimum required for renewals, and that our renewals will rather increase than otherwise, but at a much less rapid ratio than they did up to 1876. The small quantity of rails required for renewals on the London & Northwestern Railway, if other companies have relaid their roads with steel at anything like the same rate, will account in some measure for the depression in the steel rail trade; and, as our steel rails wear out, the quantity of pig-iron required to keep the road going will be represented as nearly as may be by the difference in weight between the rails when put down and when taken up for renewal, plus 7½ per cent. for loss in remanufacture. This will also represent very closely the quantity of iron required for the bath in the Siemens furnace for remelting the old steel rails, so that for a considerable period the quantity of iron required on such a line as ours will be much less than it has been during the past period; but, if steel sleepers are found to answer—and I see no reason why they should not—I hope they will in a great measure fill up the want of orders for steel rails in our various large works.

On our main line, up to the present time, we have put down 45,000 steel sleepers; and on recently examining those we first put down on the Chester and Holyhead line six years ago, I found that they were in very good order, with no signs of loose rivets, though these sleepers were made with a much less chair-base and leverage for the rivets than those we are making now. While on the subject of steel sleepers, I may observe that there has been a good deal of discussion and a number of questions have been asked me as to their tendency to work endwise, especially in curves; but, so far as our experience goes, when properly ballasted up, we do not find this tendency. Our Engineer, Mr. Bradford, who has had some of these sleepers down for a considerable time in our South Wales District on gradients of 1 in 38 and on a curve of 10 chains radius reversing into one of 15 chains radius, finds no tendency to working endwise; and, while going over the road previously referred to in North Wales, I found in many cases moss was growing on the end of the sleeper and on the ballast without the slightest sign of disturbance.

Car Coupling in England.

As is well known, freight cars in England are coupled together with a three-link chain shackled to a hook on one car, and dropped into the corresponding hook on the other car. Should one chain break the other is available. Should one hook or draw-bar break, spare side or safety chains can be used to couple the cars together. There is necessarily much slack between the cars. The whole arrangement resembles that used here on coal cars on the Lehigh Valley and other roads. As this mode of coupling is universal in England, railroad men there have generally recognized the fact that it cannot be superseded, but that greater safety might be attained if the existing links could be lifted and placed on the hook to couple the cars by a man standing entirely outside the cars. The brakeman or yardman would then escape the risk of going between the cars. This useful object has been accomplished with more or less success by various forms of the "coupling poles," which resembles an old fashioned shepherd's crook. The men engaged in coupling the cars each carry one of these coupling poles, the crook at the end of which grips the link, which can then be placed in or removed from the hook, as may be required. The *Mechanical World* giving an account of a trial of these coupling poles says:

"A wagon coupling pole contest took place at Newcastle on Good Friday last, which is interesting as showing what can be done by the aid of this simple contrivance for avoiding the danger of men going between or beneath the buffers for coupling or uncoupling goods vehicles.

For the contest, two trains, each of 19 vehicles, were drawn up, thus leaving 18 couplings for the competitors to handle. The length of each train was about 342 ft., each competitor having to run along the train and couple or uncouple all the chains, the quickest men bearing away the prizes, which varied in value from £5 15s. to 2s. 6d. * * *

"The quickness and dexterity with which the couplings were handled is certainly remarkable, the short period of 38 seconds being in one instance sufficient to perform 18 operations and run the full length of the train, the coupling of each thus occupying only an average of a little over two seconds—hardly sufficient one would imagine to look at them. The saving of time by the use of these poles over that occupied in creeping under buffers and coupling would of itself be sufficient to recommend them to railway companies, independent of their safety. Some guards and shunters are to be found, however, who do not like them and declare them to be dangerous and the cause of accidents, but there is no doubt that on the whole they reduce the amount of risk which surrounds men whose duties are in the shunting and marshaling of trains; no appliance or improved safety coupling ever invented will do away with such accidents altogether. They at any rate form an intermediate step as it were between the old plan of hand coupling and the coupling of the future, when every wagon will be equipped with a self-acting or other coupling apparatus worked from the side of the wagon. Until that time comes the pole will have its day, whilst improved forms will probably find a ready market with railway managers.

"There is little doubt that railway directors, if left to themselves, will continue to use poles rather than adopt any of the more complicated couplings, but if their hands are forced and they should be compelled by law to use the latter, it is to be hoped that they will all agree as to the particular type to be adopted, otherwise (like the continuous brake question) A will not couple up with B or B with C, and neither of them with D, thus making confusion paramount and the remedy worse than the disease."

A Luxurious Private Car.

The luxurious club car "Beauvoir," built by the Jackson & Sharp Co. for the "Club on Wheels," an organization of cotton brokers and business men in New Orleans, was sent away this morning over the Pennsylvania Railroad to Cincinnati, where she will take the Louisville & Nashville to New Orleans. The "Beauvoir," named after the Mississippi town of which Jeff Davis is a resident, is designed in the interior as a club room, and is intended for the use of the members of the Club on Wheels, all of whom live at country seats outside of New Orleans. The car is to be attached to an in-bound train in the morning, and the members of the club have the same comforts en route to the city as they would have in their own sitting rooms. The same applies to their outward journey in the afternoons. The "Beauvoir" is a novelty, and is the first car of the kind ever built in Wilmington. Her owners live on the line of the Louisville & Nashville Railroad, and the car will be run on that road.

She is 64 ft. long and is mounted on six-wheel trucks, with Allen paper wheels, equipped with the Westinghouse automatic brake and Miller platform. The exterior color is olive, with decorations and ornamental lettering emblazoned on with gold. The letters are of a new design in form and the outside coloring has a rich effect.

The general finish of the interior is in cherry, handsomely designed, with a ceiling of bird's-eye maple veneer attractively decorated. The deck sash is of variegated glass of different patterns which reflect beautiful lights and colors into the car. The hardware is old brass, which is the new rage. There are four twin centre lamps and a convenient number of basket racks and cloak hooks. The side lamps are detachable, and can be adjusted in any way to suit the convenience of a person who desires to read by them. The wash room in one end of the car is double, with pumps and basins, beveled plate mirrors and Tennessee marble tops; and at the other end is the buffet, fitted up with a buffet urn, dishes and glassware, bottle racks, a refrigerator, water tanks and water cooler. Underneath the car there are lockers for carrying provisions, ice, tool boxes, etc. Next to the buffet is a linen closet with lockers for stowing away towels and the linen of the club.

The floor of the "Beauvoir" is of hard maple, with oil finish. The furniture consists of a rolling top writing desk, four large cherry tables that are permanent, two detachable tables for lunching; there are four rattan pedestal chairs to each of the four permanent tables, 20 other reed chairs of different designs, and two couches upholstered in leather. The monogram of the club is emblazoned over the transom and the name of the car on the door.

The name of both the club and the car, as well as the monogram of the former, are also on the outside of the car, so that the wayfarer may read.—*Wilmington (Del.) Every Evening.*

A Railroad Laboratory.

Mr. G. W. Tilton, Superintendent of Motive Power of the Chicago & Northwestern Railway, is having a chemical and physical laboratory fitted up in the shops at Chicago. The intention is to provide the laboratory with all the necessary plant for making accurate tests of all material purchased by the company.—*National Car-Builder.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago, Milwaukee & St. Paul, annual meeting, in Milwaukee, Wis., June 5.

Chicago, St. Paul, Minneapolis & Omaha, annual meeting, in Hudson, Wis., June 5.

Gulf, Colorado & Santa Fe, special meeting, in Galveston, Tex., June 14.

Milwaukee, Lake Shore & Western, annual meeting, in Milwaukee, Wis., June 9.

Oregon Railway & Navigation Co., annual meeting, in Portland, Oregon, June 21.

St. Louis, Alton & Terre Haute, annual meeting, at the office in St. Louis, June 7.

St. Paul & Duluth, annual meeting, in St. Paul, Minn., June 21.

Ulster & Delaware, annual meeting, in Rondout, N. Y., June 9.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Albany, 2 per cent., quarterly, payable June 30, to stockholders of record on May 29.

Boston & Lowell, 3 per cent., semi-annual, payable July 1, to stockholders of record on June 12.

Connecticut River, 4 per cent., semi-annual, payable July 1, to stockholders of record on June 15.

Eastern in New Hampshire (leased to Boston & Maine), 2½ per cent., semi-annual, payable June 15.

Old Colony, 3½ per cent., semi-annual, payable July 1, to stockholders of record on May 31.

Philadelphia, Wilmington & Baltimore, 4 per cent., semi-annual, payable July 1.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *Master Car-Builders' Association* will hold its annual convention at Niagara Falls, beginning on Tuesday, June 8.

The *American Train Dispatchers' Association* will hold its annual convention in Chicago, beginning on Tuesday, June 8.

The *Yardmasters' Mutual Benefit Association* will hold its annual convention in St. Paul, Minn., beginning on Wednesday, June 9.

The *Master Mechanics' Association* will hold its annual convention in Boston, beginning on Tuesday, June 15.

The *Car Accountants' Association* will hold its annual convention in Buffalo, N. Y., beginning on Tuesday, June 15.

The American Society of Civil Engineers will hold its annual convention in Denver, Col., beginning on Friday, July 2.

Foreclosure Sales.

In the note of the sale of the *East Tennessee, Virginia & Georgia* road in this column last week, the omission of a single figure in the dispatches made the price paid for the road $1,250,000, some nine millions less than the fact. The bid of the Purchasing Committee's representative, who bought the road, was $10,250,000.

Transportation in Congress.

In the Senate on the 28th:

The bill forfeiting the land grants of the Northern Pacific road came up, and after a long discussion the Senate refused to lay the bill on the table, and also refused to lay on the table the amendment offered by Mr. Van Wyck (Nebraska) forfeiting all the lands not earned by the company up to July 4, 1879. The bill as reported to the Senate provided only for the forfeiting of the land-grant on the line from Wallula to Portland, where the company has not built any road, but uses the Oregon Railway & Navigation Co.'s line, but the amendment made it much more comprehensive.

Baltimore & Ohio Employes' Relief Association.

The April sheet of this Association gives the number of benefits paid for the month as follows: Main Stem, Transportation Department, 181; Machinery Department, 220; Road Department, 90; Baltimore & Philadelphia, 5; Trans-Ohio divisions, 193; Pittsburgh Division, 106; physicians' bills, 116; total, 911.

The list includes one death benefit of $2,500, one of $1,500 and seven of $1,000 each. The $2,500 payment was to the father of John T. Driscoll, locomotive engineer on the Chicago Division, accidentally killed.

ELECTIONS AND APPOINTMENTS.

Austin, Mankato & St. Cloud.—At the annual meeting in St. Paul, Minn., recently, this company elected J. W. Bishop President; S. B. McConnell, Secretary; H. P. Upham, Treasurer.

Baltimore & Potomac.—At the annual meeting in Baltimore, June 2, Gov. Oden Bowie was re-elected President, with the old board of directors.

Boston & New York Air Line.—At the annual meeting of this company (whose road is leased to the New York, New Haven & Hartford Co.) in New Haven, Conn., June 1, the following were chosen: President, Henry B. Hammond; directors, Theodore Adams, Simeon E. Baldwin, W. D. Bishop, J. N. Camp, Benjamin Douglas, S. F. Loomis, S. S. Sands, E. H. Trowbridge, T. L. Watson, George H. Watrous; Secretary, T. L. Watson; Treasurer, W. L. Sauvres.

Brenham & Brazos Valley.—The following are the officers of this new Texas company: D. C. Giddings, President; J. T. Swearingen, Vice-President; Heber Stone, Secretary; F. A. Engelke, Treasurer. Office at Brenham, Texas.

Canada Southern.—At the annual meeting in St. Thomas, Ont., June 2, the following directors were elected: Cornelius Vanderbilt, William K. Vanderbilt, James Tillinghast, Anthony G. Dulman, Charles F. Cox, Samuel F. Barger, Sidney Dillon, Joseph E. Brown and Edward A. Wickes.

Chesapeake & Ohio.—Mr. John Muir has been appointed Traffic Manager, with headquarters at Richmond, Va. He was recently Traffic Manager of the Oregon Railway & Navigation Co., and was formerly on the Northern Pacific.

Chester & Centralia.—The officers of this new company are: F. M. Gillette, President; Thos. Needles, Vice-President; S. L. Dwight, Secretary; S. M. Warner, Treasurer; R. J. Harmer, Auditor. Office at Chester, Illinois.

Chicago, Burlington & Northern.—Mr. W. J. C. Kenyon is appointed General Passenger Agent, with headquarters at St. Paul. Mr. W. B. Hamblin is appointed General Freight Agent, with headquarters at St. Paul.

Chicago & Grand Trunk.—Mr. W. E. Davis is appointed General Passenger Agent, with office in Chicago, to date from June 1. Mr. Davis has been Assistant General Passenger Agent for some time.

Chicago & Indiana Coal.—Mr. Arthur A. Hobart has been appointed General Superintendent of this road, late the Chicago & Great Southern. Mr. Hobart was first known as Superintendent of the Wisconsin Division of the Chicago & Northwestern, and 10 years ago left that road to become Assistant General Superintendent of the Chicago, Burlington & Quincy. In 1879 he came East as Superintendent of the Troy & Boston, and a year later was made Superintendent of the Boston & Lowell road. In 1881 he went back to Chicago as Superintendent of the Chicago Division of the Wabash, and in the following year was made Superintendent of the Eastern Division of the Chicago, St. Paul, Minneapolis & Omaha, which position he now leaves.

Chicago, Kansas & Western.—The officers of this company (controlled by the Atchison, Topeka & Santa Fe) are: President, Joab Mulvane, Topeka, Kan.; Vice-President, J. H. Griswold, Topeka, Kan.; Secretary and Treasurer, J. F. Scott, Topeka, Kan.; Assistant Secretary and Assistant Treasurer, G. L. Goodwin, Boston; Comptroller and General Auditor, J. H. Whitehead, Boston.

Chicago, St. Paul, Minneapolis & Omaha.—Mr. James McCabe is appointed Superintendent of the Eastern Division in place of Mr. Arthur A. Hobart, who has gone to the Chicago & Indiana Coal road. Mr. H. S. Jaynes succeeds Mr. McCabe as Superintendent of the Nebraska Division. Mr. E. L. Poole, late in the Land Department, succeeds Mr. Jaynes as Claim Agent of the road.

Chicago, St. Paul & Kansas City.—The directors of this new company are: George B. Burch, W. H. Knowlton, Ansel Oppenheim, A. F. Schiffman, Frank Skipwith, Samuel C. Stickney, Robert C. Wright. Office in Dubuque, Iowa.

Concord & Claremont.—At the annual meeting in Concord, N. H., May 26, the following directors were chosen: Josiah H. Benton, Jr., Daniel W. Johnson, Dexter Richards, A. E. Scott, Charles O. Stearns, Alvah W. Sulloway, Mason W. Tappan. The board elected Dexter Richards President; Charles P. Sanborn, Clerk; G. A. Kettell, Treasurer.

Detroit, Grand Haven & Milwaukee.—Mr. W. E. Davis is appointed General Passenger Agent, to date from June 1. He will have his office in Chicago.

Eastern.—At the adjourned annual meeting in Boston, June 1, the following directors were chosen by the stockholders: Jarvis D. Braman, Joseph H. Gray, Boston; Arthur Sewall, Bath, Me. These are all new directors, succeeding F. J. Amory, C. H. Houghton and T. W. Hyde.

East Tennessee, Virginia & Georgia.—Mr. J. J. Kness is appointed Master of Trains of the Georgia Division, in place of Mr. J. H. Garner, who has gone to the Rome & Carrollton road.

Fall Brook Coal Co.—Mr. Robert H. Canfield has been appointed Assistant Superintendent of the lines of railroad operated by this company, and assumed the duties of the position on June 1.

Flint & Pere Marquette.—At the annual meeting in East Saginaw, Mich., May 19, the following directors were elected: H. C. Potter, H. C. Potter, Jr., W. L. Webber, East Saginaw, Mich.; L. Pierce, Portland, Me.; W. W. Crapo, Francis Hathaway, New Bedford, Mass.; A. G. Bremer, Utica, N. Y.; A. M. Hoyt, S. N. Hoyt, D. Wood, New York. The board elected W. W. Crapo, President; H. C. Potter, Vice-President; H. C. Potter, Jr., Secretary and Treasurer.

Georgia Midland & Gulf.—At the annual meeting in Columbus, Ga., recently, this company elected Seaton Grantland President; G. P. Swift, Jr., Vice-President; Charles L. Davis, Secretary and Treasurer.

Gulf, Colorado & Santa Fe.—The following order from General Manager and Chief Engineer W. Snyder is dated Galveston, Tex., May 24: "Mr. W. J. Sherman is this day appointed Assistant Chief Engineer of this company, and will have immediate charge of the construction of extensions in Texas and the Indian Territory."

Jamestown Short Line.—The directors of this new company are Robert Newland, O. E. Jones, Willis Tew, A. N. Broadhead, W. H. Proudfit, W. F. Endress, D. H. Post, John Caldwell, L. B. Warner, S. B. Broadhead, Erie L. Hall, E. F. Dickinson, F. W. Stevens. Office in Jamestown, New York.

Kansas City, Memphis & Birmingham.—Capt. John A. Grant is Engineer in charge of the Eastern Division, with headquarters at Birmingham, Alabama.

Louisville, New Orleans & Texas.—Mr. A. M. Cook has been appointed Assistant to the General Manager, and will perform such duties as may be assigned to him. He will also act for the General Manager in the absence of that officer. Mr. Cook will continue to act as Purchasing Agent of the road.

Mr. A. A. Sharpe is appointed Master of Transportation, with headquarters at Vicksburg, Miss., in place of Mr. W. N. Marshall, resigned.

Manchester & Lawrence.—At the annual meeting, May 28, the following directors were chosen: Benjamin F. Martin, Nathan Parker, Manchester, N. H.; Joseph W. Smith, Andover, N. H.; Wm. P. Fowler, John A. White, Concord, N. H.; Edward A. Abbott, Wm. A. Tower, Boston. The board elected Benjamin F. Martin, President; Samuel N. Bell, Clerk.

Michigan & Ohio.—Mr. George L. Bradbury is appointed Receiver in place of Mr. J. A. Latcha, resigned. Mr. Bradbury was recently General Manager of the Peoria, Decatur & Evansville.

Through a typographical error this item was printed in this column last week under the head of "Washington & Ohio."

Middletown, Unionville & Water Gap.—This company, whose road is leased to the New York, Susquehanna & Western Co., has elected Stephen V. White President; Henry Marks, Vice-President; John P. Rafferty, Secretary and Treasurer.

Milwaukee & Whitefish Bay.—The incorporators of this company are: Richard Barker, Valentine Blatz, Wm. H. Bradley, P. V. Deuster, J. V. Dupre, J. H. Lowry, Guido Pfister, Otto Z. Wietusch, T. W. Williams. Office in Milwaukee, Wisconsin.

Mississippi & Tennessee.—Mr. A. J. Knapp having resigned his position as General Freight and Passenger Agent, the office will not be filled for the present, but all communications should be addressed to General Superintendent Burke.

Nashua & Lowell.—At the annual meeting in Nashua, N. H., last week, the following directors were chosen: W. W. Bailey, Francis A. Brooks, Gedney N. Richardson, A. M. Shaw, Jeremiah W. White; Clerk, Walter A. Lovering; Treasurer, Jeremiah W. White.

New York, Ontario & Western.—The following circular from General Manager J. E. Childs is dated New York, May 28:

"On and after June 1, the Utica, Clinton & Binghamton and the Rome & Clinton railroads will be operated by this company, in charge of C. W. Lanpher, Superintendent, with office at Norwich, N. Y.

"Separate accounts will be kept for these lines in the name of the Utica Division, and agents and conductors will send their reports and remittances to Mr. John Burton, Secretary and Treasurer, 16 and 18 Exchange place, New York.

"The Freight and Passenger Department will be in charge of Mr. J. C. Anderson, General Freight and Passenger Agent, 16 and 18 Exchange place, New York, to whom agents and all interested should make application in relation to any business of these departments.

"Passes of the N. Y., O. & W. Railway Co. will be honored on the Utica Division."

Northern (New Hampshire).—At the annual meeting in Concord, last week, the following directors were chosen: George W. Nesmith, Alvah W. Sulloway, Franklin, N. H.; George E. Todd, Concord, N. H.; Josiah H. Benton, Jr., Benjamin P. Cheney, Uriel Crocker, Silas Peirce, Boston. The stockholders elected Uriel H. Crocker, Wyman Pattee and Wm. Powers Wilson Auditing Committee. The board elected Alvah W. Sulloway President; Wm. L. Foster, Clerk and Treasurer.

Nova Scotia.—The directors of the consolidated railroad company, which is to take all the railroads owned by the province of Nova Scotia are: Adam Burns, W. Esson, Edward Farrell, H. H. Fuller, John S. Maclean, Charles A. Scott, Halifax, N. S.; L. E. Baker, Jacob Bingay, Yarmouth N. S.; Wm. Eckersley, R. G. Ewes, Jasper W. Johns, B. de C. Nixon, G. W. Owen, F. F. Pigott, R. J. Price, Adam W. Watson, London, England.

Mr. Charles A. Scott will be General Manager of the company. He was for some time General Manager of the Nova Scotia government lines and also of the lines owned by the province of Quebec.

Old Colony Steamboat Co.—At the annual meeting of this company (which is controlled by the Old Colony Railroad Co.) in Boston, June 1, the following directors were chosen: Frederick L. Ames, Cornelius N. Bliss, Thomas J. Borden, John G. Brayton, Charles F. Choate, Leander N. Lovell, Silas Pierce, Wm. J. Rotch, Nathaniel Thayer.

Pennsylvania.—The board of directors has approved the appointment of Mr. F. H. Kingsbury as Through Freight Agent, with office in New York, in place of George B. Edwards. Mr. W. J. Rose has been appointed Division Freight Agent.

Pennsylvania Company.—At the annual meeting in Pittsburgh, June 1, the following directors were chosen: Wm. H. Barnes, J. N. McCullough, Thomas D. Messler, Wm. Thaw, Pittsburgh; A. J. Cassatt, J. N. DuBarry, John P. Green, H. H. Houston, Wistar Morris, George B. Roberts, Edmund Smith, Henry D. Welsh, John Price Wetherill, Philadelphia.

Peterboro.—At the annual meeting in Nashua, N. H., last week, the following directors were chosen: S. A. B. Abbott, Thomas B. Eaton, John H. George, Virgil C. Gilman, Albert McKean, George A. Ramsdell, Edward Spalding; Clerk, Gilman Shattuck.

Peterboro & Hillsboro.—At the annual meeting in Concord, N. H., May 28, the following were elected: President, Alvah W. Sulloway, Franklin, N. H. Directors: John G. Campbell, Hillsboro, N. H.; Wyman Pattee, Enfield, N. H.; George E. Todd, Concord, N. H.; Wm. Power Wilson, Lexington, Mass.; Josiah H. Benton, Jr., George A. Kettelle, Boston. Clerk and Treasurer, E. H. Woodman, Concord.

Rochester, Hornellsville & Lackawanna.—The officers of this new company are: President, John McDougall; Secretary, I. W. Near; Treasurer, Charles Adsit. Office in Hornellsville, New York.

Rome & Carrollton.—Mr. J. H. Garner has been appointed General Superintendent, with office in Rome, Ga. Mr. Garner began work on the Mobile & Ohio road 15 years ago, and after serving on the Virginia Midland and the Memphis & Little Rock, was made Master of Trains of the Alabama Division of the East Tennessee, Virginia & Georgia road. He left that road to go to Mexico, but returned to it two years later as Master of Trains of the Georgia Division, which he has just resigned.

St. Louis & San Francisco.—A St. Louis dispatch says that Capt. C. W. Rogers, long Vice-President and General Manager, will hereafter be First Vice-President only. Mr. Henry L. Morrill, late with the Boston, Hoosac Tunnel & Western, is appointed General Manager. The change is made at Captain Rogers' request, in order to give him some relief from pressing duties, and an opportunity to secure needed rest. Mr. John O'Day, long General Attorney of the company, is chosen Second Vice-President.

Sullivan County.—At the annual meeting in Concord, N. H., May 27, the following directors were chosen: Charles J. Amidon, Hinsdale, N. H.; John H. Albin, Henniker, N. H.; Nathaniel E. Martin, Concord, N. H.; James H. Williams, Bellows Falls, Vt.; Frederick Billings, Woodstock, Vt.; A. B. Harris, Springfield, Mass.; Henry C. Robinson, Hartford, Conn. The board elected A. B. Harris, President; John H. Albin, Clerk; E. F. Lane, Treasurer.

Suncook Valley.—At the annual meeting in Manchester, N. H., May 27, this company elected Samuel N. Bell, President; B. P. Cilley, Clerk.

Suncook Valley Extension.—At the annual meeting in Manchester, N. H., May 27, this company elected Samuel N. Bell President; B. P. Cilley, Clerk.

Union Pacific.—Mr. T. A. Davis is appointed Master Mechanic of the Nebraska Division, with office at Omaha, in place of Mr. J. H. McConnell, resigned. Mr. J. P. Hovey is appointed Master Mechanic of the Wyoming Division, with office at Laramie, Wyoming, in place of Mr. Davis, transferred.

West Shore.—The following from Traffic Manager J. W. Musson, is dated New York, May 27: "Mr. F. L. Pomeroy, General Freight Agent, having resigned, Mr. Lucius Smith has been appointed Assistant General Freight Agent of the West Shore Railroad, with office at No. 5 Vanderbilt avenue, New York. Until further notice, the duties heretofore performed by the General Freight Agent will devolve upon the Assistant General Freight Agent, to whom all communications, reports, etc., heretofore sent to the General Freight Agent, will be addressed. The above appointment will take effect on June 1, 1886."

Wilton.—At the annual meeting in Nashua, N. H., last week, the following directors were chosen: Wm. Ramsdell, John Reed, John A. Spalding, Solomon Spalding, Harvey A. Whiting; Clerk, Archibald H. Dunlap.

Wisconsin Central.—At the annual meeting in Milwaukee, May 27, the old board was re-elected with the exception of E. B. Phillips, who is succeeded by H. F. Spencer, of Boston. The board re-elected the old officers.

PERSONAL.

—Mr. W. N. Marshall has resigned his position as Master of Transportation of the Louisville, New Orleans & Texas road.

—Mr. A. J. Knapp has resigned his position as General Freight and Passenger Agent of the Mississippi & Tennessee road.

—Mr. J. H. McConnell has resigned his position as Master Mechanic of the Nebraska Division of the Union Pacific road, to date from June 1.

—Mr. George B. Edwards has resigned his position as Through Freight Agent of the Pennsylvania Railroad, but continues Eastern Manager of the Union Line.

—Mr. Wm. A. Wood, Jr., who died at his home in Verona, Pa., May 29, aged 34 years, entered the employ of the Allegheny Valley Railroad as a boy of 18, in 1868. He rose steadily until he was appointed Master Mechanic two years ago, on the death of the late George W. Glass.

—Mr. Robert Hardie, who has been appointed Superintendent of the New York Locomotive Works at Rome, N. Y., was at one time Consulting Engineer for John Elder & Co., of Glasgow, Scotland. He has been known in this country for some years as a mechanical engineer and designer of locomotives.

—Mr. Henry Havemeyer, who died suddenly at his summer residence in Babylon, N. Y., June 2, aged 48 years, was a well-known New York merchant. He was for several years a director and for one year President of the Long Island Railroad Co., in which his father at one time owned a controlling interest.

—Mr. Culver Barcalow, who died at his residence in Somerville, N. J., June 1, aged 63 years, was well known throughout New Jersey as the agent and representative of the Pennsylvania Railroad Co. at Trenton, although he held no official position with that company. He never held public office, but was a power in New Jersey politics, and had much influence with the politicians of both parties.

—The French delegates sent out to inspect and report on American railroads arrived in New York May 31, on the new steamer "La Champagne" of the Compagnie Générale Transatlantique. They are Messrs. Barabant and Siegler, representing the Eastern Railroad Co.; Messrs. Sauvage and de Fontonne, the Northern; Messrs. Visinet and Gasc, the Western; Messrs. Baudry and Roederer, the Paris, Lyons & Mediterranean. They will remain in the United States only about three weeks, and do not expect to go further west than Chicago.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1886.	1885	Inc. or Dec.	P. c.
Five months to May 31:				
Mil., L. S. & W.	$693,198	$458,814	I. $234,324	51.0
Four months to April 30:				
Georgia Pacific. .	$251,176	$216,875	I. $34,301	15 8
Mem. & Charles..	432,856	450,759	D. 17,903	3.9
Net earnings...	120,767	18,345	I. 102,422	558 3
N. Y., L. E. & W.	5,385,239	4,661,111	I. 724,128	15.5
Net earnings. ..	1,644,6?4	1,160,294	I. 484,330	41 8
N. Y. & New E. .	1,174,524	982,553	I 191 971	19.5
Net earnings...	404,704	294,159	I. 110,545	37.6
N. Y., P. & Ohio.	1,812,392	1,563,956	I. 248,436	15 9
Net earnings....	556,524	379,786	I. 176,738	46.5
Northern Pacific..	2,926,169	2,692,823	I. 233,346	8.7
Net earnings. ..	1,106,565	917,738	I. 188 827	20.6
Ohio & Miss.....	1,124,566	1,198,734	D. 74,168	6.2
Net earnings....	263,710	249,405	I. 14,305	5 7
Phila. & Reading.	8,478,914	7,904,486	I. 574,428	7.3
Net earnings. ..	3,076,087	2,822,268	I. 253,819	9.0
St. Jo. & Gd. I..	369,225	361,858	I. 7,367	2.0
Net earnings. .	179.704	109,118	I. 70,586	64.7
West Jersey.....	325,931	303,676	I. 22,225	7.3
Net earnings...	113,035	100,058	I. 12,977	12 9
Three months to March 30:				
Cl., C., C. & I..	$892,574	$827,161	I. $65,413	7.9
Net earnings...	253,374	155,034	I. 98,340	63.4
Month of March:				
Cl., C., C., & I..	$314,321	$290,145	I. 24,176	8.3
Net earnings....	103,493	59,398	I. 44,095	74.2
Month of April:				
Georgia Pacific...	$62,377	$49,853	I. $12,524	25.1
Mem. & Charles.	96,287	98,994	D. 2,707	2.7
Net earnings...	37,478	11,772	I. 25,706	217.8
N. Y., L. E. & W.	1,418,702	1,201,648	I. 217,054	18 1
Net earnings...	454,300	295,806	I. 158,494	53.5
N. Y. & New E...	314.504	262,102	I. 52,402	20.0
Net earnings...	106,057	72 237	I. 33,820	47.0
N. Y., P. & Ohio.	474.490	393,182	I. 81 308	20.7
Net earnings...	164,470	99,025	I. 65,445	66.1
Northern Pacific..	993,483	877,665	I. 115,818	13 2
Net earnings...	484,744	399 583	I. 85,161	21.3
Ohio & Miss.....	270,198	288.964	D. 18,766	6 5
Net earnings...	59,870	67,322	D. 7,452	11.1
Phila. & Reading.	2,177,972	2,343.973	D. 166,000	7.1
Net earnings...	742,526	951.318	D. 208,792	21.9
St. Jo. & Gd. I.	90.415	72,165	I. 18,250	25 3
Net earnings....	42,912	1,049	I. 41,863	....
West Jersey.....	102.365	94,208	I. 8,157	8.7
Net earnings...	40,498	37,974	I. 2,524	6.6
Month of May:				
Mil., L. S. & W..	$196,065	$100,085	I. $95,980	95 8
Third week in May:				
Chi. & East. Ill..	$28,459	$36,986	D. $8,527	23.1
Det., Lan. & No.	19,913	21,120	D. 1,207	5.7
Grand Trunk.....	310,221	275.151	I. 35,070	12.8
Illinois Central...	198,000	215,467	D. 17,467	8 1
Iowa lines.....	30,000	31 836	D. 1,836	5.7
Mil. & Northern..	10,930	11,610	D. 680	5 9

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending May 22 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite	636,720	612,794	I. 23,926	3.9
Eastern bituminous	171,934	238,521	D. 66,587	27.9
Coke	85,337	49,129	I. 36,208	73.8

The strike in the Pennsylvania and Maryland bituminous districts is now practically at an end, and large shipments may be expected from those districts.

The coal tonnage of the Missouri Pacific lines for the year ending Dec. 31 was:

	1885.	1884.	Inc. or Dec.	P. c
Mined on line	1,031,180	1,002,972	I 28,208	2.8
Received from other roads.	448,259	514,287	D. 66,028	12.2
Total	1,479,439	1,517,259	D. 37,820	2.5

The coal mined on the line last year was disposed of as follows: Company's use, 480,091; for Texas & Pacific road, 82,272; transported as commercial coal, 468,817; total, 1,031,180 tons.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the five months to May 29 was:

	1886.	1885.	Inc. or Dec.	P.c.
Coal Port for shipment	19,377	21,946	D. 2,569	11.7
S. Amboy "	196.675	221,929	D. 25,254	11.4
Local points on N. J. divs.,	351,791	345.882	I. 5,909	1.7
Co.'s use " "	95,622	90,993	I. 4,629	5.1
Total	663,465	680,750	D. 17,285	2.5

Of the total this year 556,061 tons were from the Lehigh Region and 107,404 tons from the Wyoming Region.

Actual tonnage passing over the Huntingdon & Broad Top road for the five months to May 29 was:

	1886.	1885.	Inc. or Dec.	P.c.
Broad Top coal	160.370	73,627	I. 86.743	117.8
Cumberland coal	81.576	169,864	D. 88,288	51.9
Total	241,946	243,491	D 1.545	0 6

The Broad Top coal is mined on the line; the Cumberland is carried through for the Pennsylvania Railroad.

The coal tonnage of the Pennsylvania Railroad Division of the PennsylvaniaRailroad for the five months to May 29 was:

	1886.	1885.	Increase.	P. c.
Coal	4,515,306	4,359,965	155.341	3.6
Coke	1,251,602	1,028,672	222,930	21.6
Total	5,766,908	5,388,637	378,271	7.1

This includes all coal passing over the road, whether mined on the line or received from other roads.

Cotton.

Cotton movement for the nine months of the crop year from Sept. 1 to May 28 is reported by the *Commercial and Financial Chronicle* as follows, in bales:

Interior markets:	1885-86.	1884-85.	Inc. or Dec.	P. c.
Receipts	3,282,614	2,591,688	I. 690,926	26.6
Shipments	3,141,772	2,551,096	I. 590.676	23.2
Stock, May 28	156,692	57,807	I. 98,885	171.1
Seaports:				
Receipts	5,165,338	4,701,361	I. 463,978	9.9
Exports	3,827,584	3,660,227	I. 167,327	4.6
Stock, May 28	565,777	449,468	I. 116,309	25.9

A considerable part of the shipments from interior markets reappears in the receipts at seaports. The exports are the shipments by sea to foreign ports only.

The *Chronicle* says: "In the table below we give the receipts from plantations, and add to them the net overland movement to May 1, and also the takings by Southern spinners to the same date, so as to give substantially the amount of cotton now in sight:

	1885-86.	1884-85.	1883-84.	1882-83.
Receipts at the ports to May 28	5,165,339	4,701,361	4,751,662	5,824,186
Interior stocks on May 28 in excess of Sept. 1.	140,842	40,592	15,018	98,194
Total receipts from plantations	5,306,181	4,741,953	4,766,680	5,922,380
Net overland to May 1.	742,113	578,718	546,726	599,862
Southern consumption to May 1	279,000	239,000	264,000	275,000
Total in sight May 28.	6,327,294	5,559,671	5,577,406	6,797,242
Northern spinners' takings to May 28	1,613,407	1,261,269	1,438,896	1,611,185

"It will be seen by the above that the increase in amount in sight May 28, as compared with last year, is 767,623 bales; the increase as compared with 1883-84 is 749,888 bales; and the decrease from 1882-83 is 469,948 bales."

Southwestern Railway Association.

The total earnings of the lines in the Southwestern Railway Association on abusiness in the Association during March amounted to $675,754, and in April to $740,208, a total of $1,415,962 in two months. The following tables give the details:

Lines.	West-bound.	East-bound.	Totals.
C & A	$175,252	$139,856	$315,109
Quincy line	142,528	91,351	233,878
Hopkins line	56,537	10,328	66,866
H. & St. J.	15.315	4,889	20,204
C., R. I. & P.	158,320	27,528	185,849
W., St. L. & P.	178,386	164,356	342.742
Mo. Pac	47,786	110,995	158.781
Totals	$774,125	$549,305	$1,323,429
B. & M.	8,812	44,605	53.418
St. L. & S. F. Pts.	2.896	4.926	7,822
M. P. J. & Pts.	8,940	22,351	31,292
Totals	$794,774	$621,188	$1,415,962

The Quincy and the Hopkins lines and the Hannibal & St. Joseph all belong the Chicago, Burlington & Quincy.

On the total business for the two months the Burlington, the Rock Island and the Wabash were over their allotted proportions, the other lines falling short of them.

Indianapolis Car Movement.

The number of cars received and forwarded at Indianapolis has been:

	Week ending			
	May 8.	May 15.	May 22.	May 29.
1886—Total	17,950	16,975	18,796	18,950
Loaded	13,840	12,848	14,436	14,321
1885—Total	17,609	17,547	16,975	18,271
Loaded	13,212	13,156	12,848	13,845

West-bound movement continues heavy, and there was last week very little decrease in east-bound movement. The movement over the north and south lines in both directions has compared well with previous years for two weeks past.

Special Tea Trains.

The first shipment of new crop tea from Yokohama passed through Chicago yesterday. The shipment consisted of 380 tons. It left Yokohama on the steamship "San Pablo" and made the running time of 14 days and 16 hours to San Francisco. From San Francisco it was shipped on two special trains. The first train left by Central Pacific the afternoon of May 22; left Council Bluffs by Chicago & Northwestern at 1.50 a. m. May 28, and arrived in Chicago at 9.50 p. m. May 28. The second train left San Francisco in the forenoon of May 24; left Council Bluffs at 2.15 a. m. May 28, and arrived in Chicago at 1.50 a. m. May 29. Both trains of 11 cars, destined to New York and routed *via* the Lake Shore & Michigan Southern, were delivered to that line at 6 a. m. May 29, and left for there yesterday by special train.

California Through Freights.

Shipments of through freight eastward from California points over the Central and Southern Pacific lines in March were 38,512 tons, against 14,076 in March of last year, an increase of 24,436 tons, or 174 per cent. Leading items of freight were 9,082 tons sugar, 5,242 tons wine, 1,737 tons canned goods and 1,715 tons beans.

For the three months to March 31 the shipments were, in tons:

	1886.	1885.	Increase.	P. c
San Francisco	40,644	.....	.....	....
Other points	16,467	.....	.....	.....
Total	57,111	34,969	22,142	63.3

The shipments this year are the largest on record, those for March being the heaviest ever reported in one month.

Buffalo Grain Traffic.

Buffalo grain receipts by lake up to May 31 are reported as below, flour in barrels and grain in bushels, flour being reduced to wheat in the totals:

	1886.	1885.	1884.	1883.
Flour	659,507	196,095	183.755	256,538
Grain	14,945,306	6,849,599	6,925,329	10,392,244
Total, bushels	18,242,841	7,830,074	7,844,104	11,674,934

The total increase this year over last was 10,412,767 bushels, or 139 per cent. Some part of this gain was due to an earlier opening of navigation this year. The large increase in flour receipts by lake this year is especially notable; more flour came by lake this year than ever before.

Shipments eastward of grain received by lake for the same period were, in bushels:

	1886.	1885.	1884.	1883.
By canal	7,978,372	4,697,247	4,900,189	5,597,815
By rail	5,623,207	3,554,495	1,294,752	2,819,044
Total	13,601,579	8,251,742	6,194,941	8,416,859
Per cent. by rail	41.3	43.1	20.9	33.5

The canal opened May 1 this year, May 11 last year, May 7 in 1884 and May 7 in 1883.

Lake Superior Iron Ore.

Shipments of iron ore from the Lake Superior Region up to May 26 are reported by the Marquette *Mining Journal* as follows:

		1886.	1885.	Inc. or Dec.	P. c.
Marquette District,	L'Anse	.....	1,785	D. 1,785	100.0
" "	Marquette	98,214	37,323	I. 60,891	137.0
" "	St. Ignace	10,787	16,429	D. 5,642	34.4
" "	Escanaba	67,546	39,354	I. 28,192	72.0
Menominee	"	110,985	65,705	I. 45,280	68.9
Gogebic	Ashland	16,176	.....	I. 16,176	...
Vermillion Lake,	Two Harbors	9,730	.....	I. 9,730	...
Total		313,438	160,596	I. 152,842	95.2

The large gain this year is due to the earlier opening of navigation. Pig iron shipments amounted to 3,537 tons.

RAILROAD LAW.

Exemption from Taxation Cannot Be Transferred.

In the case of the State *ex rel.* Krumpacker against the Chicago, Burlington & Kansas City Co., the Missouri Supreme Court decides as follows, reversing the decision of the lower court.

A railroad company was created under provisions of acts of Missouri Legislature of Jan. 22, 1857, and charter amended by acts of Nov. 5, 1857, and March 19, 1866, which laws exempted said railroad's property from taxation. Subsequently the directors of the railroad passed resolutions to avail themselves of the act of March 21, 1868, as to building branch roads, which act also exempted such branch roads from taxation. Defendant railroad company became the owner of the first road, branches and franchises, by purchase at foreclosure sale had upon the mortgage thereon, and claimed the same exemption from taxation as was given to the first road when originally constructed. Defendant company also built certain branch roads and claimed same exemption from taxation on them.

Held, That defendant road did not acquire immunity from taxation by purchase of first road, and no branch built by it could take on this exemption; that the branch act of 1868 cannot be construed to authorize a transfer by mortgage or otherwise of the immunity from taxation. Exemption from taxation is a personal privilege to the person or corporation to which it is given, incapable of transfer, unless there is express statutory authority therefor. Franchises "are positive rights or privileges without the possession of which the road of the company could not be successfully worked. Immunity from taxation is not one of them." As there was no authority given by law to convey or assign the right to be exempt from taxation, it is therefore immaterial what words were used either in the mortgage or decree of foreclosure.

New Jersey Railroad Taxation.

The New Jersey Court of Errors and Appeals has reversed the decision of the Supreme Court, and holds that the railroad tax law of 1884 is not unconstitutional, but is valid. Only two judges dissented from this opinion.

The Court holds that the power of taxation is vested in the Legislature, and is limited only by constitutional provisions or such legislative contracts are irrepealable in their terms. The courts can deal only with these limitations and have nothing to do with questions of the policy or justice of a tax law, as long as it does not violate the constitutional provisions.

The Court further holds that the separation of railroad property and the appointment of a special commission to assess it are not provisions in violation of the constitution. This division is not an arbitrary selection, but may be considered necessary in view of the peculiar nature of railroad property and the uses to which it is put, and the law, applying to all property of this class, may be fairly considered a general and not a special law. Further, the appointment of a state board of assessors was proper and necessary to secure the enforcement of the constitutionai provision that taxation must be not only regulated by general laws, but also by uniform rules.

The Court further holds that all taxes are really imposed by authority of the state, and that it can make no difference to the railroads whether the taxes levied upon them are applied to state or to local municipal purposes.

The Court holds that the valuation of property by what it is worth for the uses to which it is put, and not by its cost, is proper and legitimate. It also holds that franchises can properly be considered taxable. The point raised that the law was in violation of the Fourteenth Amendment to the Constitution of the United States is set aside as untenable.

The opinion concludes by the statement that the claim made that the act will not apply to those companies whose charters contain a provision that they shall pay a tax of one-half of 1 per cent. on the cost of their property, holds good only in the cases of those companies whose charters were obtained prior to 1846. All charters granted under the constitution adopted in that year are subject to repeal or to such alterations as the Legislature may deem fit.

Under the last clause, only four companies in the state will be exempt from the law by reason of special charter exemptions.

OLD AND NEW ROADS.

Albemarle & Raleigh.—In addition to the survey made for the extension of this line from Tarboro, N. C., to Raleigh, another line has been run, starting from Nashville, crossing the Raleigh & Gaston near Wake Forest, crossing the Neuse River at Wyatt's Bend, and running through Dayton towards Durham. It is understood that the people of Durham are willing to pay a considerable bonus to secure the road.

Boston & Albany.—The Boston *Advertiser* of June 2 says: "A committee representing the Executive Board of District 30, Knights of Labor, held a conference with President Bliss and Superintendent Barnes of the Boston & Albany road on Monday, relative to an advance in wages. After a friendly discussion of the matter the salaries of those men in the freight handlers' and trackmen's departments now receiving $1.50 per day were advanced to $1.65 per day, and those receiving $1.75 per day were increased to $1.90, while those obtaining $2 per day will hereafter be paid $2.15.

Boston & Lowell.—The Boston *Herald* says: "It is gossip that this company will give the Central Massachusetts Co. this week the required three months' notice of desire to discontinue the present operating agreement. But the report does not appear to be well founded; at least, Boston & Lowell officials said no later than yesterday that they desired to continue the arrangement. The train service will be reduced to seven trains each way per day over the Central."

"The earnings of the Boston & Lowell road for the six months from Oct. 1 to March 31 show an increase of $40,000 net, which increase, if continued through the balance of the year, would equal 9 per cent. earned on the stock. This increase comes largely from the growth of local business on the Southern Division, there having been built, or are now in the process of construction, between 1,500 and 1,600 new houses on its suburban line."

Brenham & Waco.—This company has been organized to build a railroad from Brenham, Tex., westward to Waco, a distance of about 100 miles. Surveys are now being made for the proposed line.

Chicago, Burlington & Quincy.—A new branch of this company's Burlington & Missouri River line was completed and opened for traffic last week. The branch extends from Fairmont, Neb., to Geneva, the county seat of Fillmore County, and is 8 miles long.

Chicago, Kansas & Western.—This company has been formed by the consolidation of the following-named companies recently organized in Kansas: The Arkansas River & Western, the Walnut Valley & Colorado, the Pawnee Valley & Denver, the Independence & Southwestern, the Emporia & El Dorado Short Line, the Colony, Neosho Falls & Western, the Ottawa, Osage City & Council Grove, the Kansas, Oklohoma & Western, and the Chicago, Kansas & Western. These companies were all formed to build branches or extensions of the Atchison, Topeka & Santa Fe, and under the organization of the consolidated corporation that company will build the various new lines which it has projected in Kansas.

Chicago & Northwestern.—This company has completed a branch running from Winona Junction, Wis., to La Crosse, a distance of about 9 miles. Some work remains to be done to finish it up, but it is expected that trains will shortly be put upon the branch. The company has heretofore run into La Crosse on the track of the Green Bay, Winona & St. Paul road.

Chicago, St. Paul & Kansas City.—This company has filed articles of incorporation to build a railroad from Dubuque, Ia., to Kansas City, Mo. The incorporators are nearly all gentlemen connected with the Minnesota & Northwestern road.

Cleveland, Columbus, Cincinnati & Indianapolis.—The statement for March and the three months to March 31 is as follows:

	March.		Three months.	
	1886.	1885.	1886.	1885.
Earnings	$314,321	$290.145	$892,574	$827,161
Expenses	210,828	230,747	639,200	672,127
Net earnings	$103,493	$59,398	$253,374	$155,034
Fixed charges	69,087	63,717	205,495	191,163
Surplus	$34,406	*$4,319	$47,879	*$36,129

* Deficit.

Expenditures for additions to property for the three months this year were $67,274, or $19,395 in excess of the surplus. These expenditures included $30,000 cash paid for four new locomotives.

Denver, South Park & Pacific.—The following notice is issued by Mr. Henry McFarland, Treasurer of the Union Pacific Co., under date of May 29: "The coupons which fell due on May 1, 1886, on bonds of the Denver, South Park & Pacific Co. will be paid on presentation at the office of Winslow, Lanier & Co., No. 26 Nassau street, New York, or at the office of the Treasurer of the Union Pacific Co. in Boston."

Detroit, Bay City & Alpena.—Grading is now well advanced on the extension of this road from Black River, Mich., northward, along the shore of Lake Huron, to Alpena, a distance of 22 miles, and tracklaying will shortly be begun. Work has also been begun on a branch from the main line to Loon Lake, a distance of 16 miles. This branch will be used chiefly for logging purposes.

East Tennessee, Virginia & Georgia.—The committee representing the stockholders and income bondholders of this company have issued a circular, stating that at the hearing of their applications to postpone the sale of the road the Court decided adversely. The committee further states that after careful investigation they have come to the conclusion that there was no sufficient ground for the charges of fraud made against the directors of the company. It was also made to appear that any further opposition to the bondholders' plan of reorganization could only result in protracted litigation, without substantial benefit to either party. The committee was not willing to assume the responsibility of such a contest and deemed it wiser to harmonize all interests. An arrangement was accordingly made with the bondholders' committee by which all the assessments paid to the opposition committee will be refunded and owners who have joined with that committee will be given an opportunity to deposit their securities with the Central Trust Co. in New York and to join in the general agreement reorganization, up to and including June 3, and all holders are advised to take advantage of this opportunity.

The Reorganization Committee gives notice of a meeting of all holders of certificates for consols debentures and Cincinnati & Georgia bonds deposited, to be held at the office of

the Central Trust Co. in New York, June 30, to select 15 directors for the new company.

Fremont, Elkhorn & Missouri Valley.—On the extension of the Black Hills branch, from Buffalo Gap, Dak., to Rapid City, track has been laid for 12 miles northwest from Buffalo Gap, leaving about 30 miles to be completed to reach Rapid City. This will be the first line completed to a terminus in the Black Hills region.

On the extension of the line from Chadron, Neb., westward to Fort Fetterman, track is reported laid for 30 miles, and the grading is advancing rapidly.

Georgia Midland.—A considerable force of convicts is now employed on the grading of this road from Columbus, Ga., towards Griffen. A section of 10 miles has been let under contract and the grading on this section is now well advanced. Convicts are employed on the second section of 10 miles.

Gulf, Colorado & Santa Fe.—The grading is being pushed on the extension from Fort Worth, Tex., north to the Red River. A portion of this extension will be on the roadbed graded several years ago for the Chicago, Texas & Mexican Central line. Tracklaying has been begun and at latest accounts the track was down for 5 miles from Fort Worth.

Houston & Texas Central.—A dispatch from Galveston, Tex., May 26, says that on that day the United States Circuit Court decided that it must dismiss the suit of the Southern Development Co. against this company, under which the present Receivers were appointed, and this decision, of course, required the discharge of the Receivers. On the same day the Court made an order instituting a new receivership on the suit of the first-mortgage bondholders, and appointed as Receivers under this order Messrs. Nelson S. Easton and James Rintoul, the trustees under the first mortgage, and Charles Dillingham, of New Orleans, who was one of the receivers under the former receivership.

The old suit, which has now been dismissed, was brought by the Southern Development Co. under a claim for $600,000, money advanced to enable the company to pay interest and for other purposes. The Southern Development Co., which is an organization controlled by the Southern Pacific, held a majority interest in the Houston & Texas Central stock, which it had purchased from the Morgan estate, and procured the receivership in order to protect its interest in the road on the theory that its claims for advances was a prior lien to that of the first mortgage. Subsequently a proposition was made to the bondholders to reduce interest and fund certain coupons, which they declined to accept, and the trustees under the first mortgage entered a demurrer against the original suit. This demurrer was recently argued before the United States Court and, after prolonged hearing, was sustained on the ground that the claim set up by the Southern Development Co. did not entitle it to any prior lien upon the earnings of the company. The Court, therefore, has taken the action noted above and has instituted a new receivership in the interest of the bondholders whose coupons are now in default, thereby recognizing their prior lien.

A later dispatch says that the attorneys for the Southern Development Co. entered notice of appeal from the decree of the Court to the United States Supreme Court, asking that this appeal be allowed to operate as a *supersedeas*. The Court took this motion under advisement and subsequently adjourned for a week.

Jamestown Short Line.—This company has been organized to build a railroad from Jamestown, N. Y., to a junction with the Dunkirk, Allegheny Valley & Pittsburgh road. The line will be about 4 miles long and will be operated in connection with the Chautauqua Lake road.

Jefferson City, Kansas & Oklahoma.—This company has filed articles of incorporation in Missouri to build a railroad from Jefferson City, Mo., southwest to a point in Crawford County, and thence through Kansas to the Indian line.

Joliet, Aurora & Northern.—The track on this road is now laid from Joliet, Ill., northwest to Plainfield, 11 miles, and construction trains are running. Work is progressing steadily on the 12 miles from Plainfield to Aurora.

Kentucky & South Atlantic.—A Louisville dispatch of June 2 says: "In the United States Court to-day B. F. McCormick, Receiver of the Kentucky & South Atlantic Railroad, Sheriffs Robinson and Ringo, and Judge Day, of Mount Sterling, were tried for contempt of court. McCormick had been appointed Receiver of the road by the State Circuit Judge. The Federal Court appointed George Harper, who took possession. McCormick, with the aid of Judge Day and the sheriffs, put Harper out, seizing a train loaded with passengers. A United States marshal then turned out the State Receiver. The Federal judge to-day dismissed the sheriffs, but held the State Judge and Receiver to answer."

Lackawanna & Pittsburgh.—The summer time table of this road, taking effect May 28, shows an increase of train service on all the divisions.

Marshall, Paris & Northwestern.—Track is reported laid on this road to Brushy Creek, Tex., 5 miles northwest from the late terminus at Hayward and 16 miles from Marshall. Grading is in progress from Brushy Creek to Gilmer, 30 miles. The road was begun as a narrow gauge line, but arrangements have been made to change it to standard gauge, and the track already laid will be changed as soon as some rolling stock has been received.

Memphis & Charleston.—The statement for April and the ten months of the fiscal year from July 1 to April 30 is as follows:

	April.		Ten months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$96,287	$98,994	$1,161,380	$1,224,340
Expenses	58,809	87,222	755,057	976,924
Net earnings	$37,478	$11,772	$371,325	$247,416

For the ten months the gross earnings decreased $62,960, or 5.1 per cent., and the expenses $186,869, or 19.1 per cent., leaving a gain of $123,909, or 50.1 per cent., in net earnings.

Memphis & Little Rock.—It is reported that arrangements are being made to extend this road from Little Rock, Ark., to Hot Springs, and thence southwest, with the intention of reaching some point in Texas.

Merrill & Abbottsford.—This company has filed amended articles of incorporation, increasing its capital stock to $1,300,000, and providing that the line shall extend from Abbottsford, Wis., eastward to Warsaw and Merrill, a distance of 65 miles.

Mexican Railroad Notes.—The following notes are from the *Mexican Financier* of May 26:

El Estado de México says that Governor Zubieta is endeavoring to establish a railroad from Toluca to Tenango and Tenancingo. The district of Tenancingo is very rich in woods, minerals and a fine quality of marble, and increased facilities for transportation would undoubtedly stimulate a much greater degree of energy in developing its natural resources.

Work on the railroad from Mérida to Izamal in Yucatan is progressing rapidly and the building of the Tixpehual and Tixkokob Stations will soon be commenced. On April 30 Mr. José Rendon Peniche, the concessionaire, accompanied by the Governor of the state and several officials of the road, made a trip to Tixkokob, where they were cordially received by the inhabitants. The station is to be erected very near to the Plaza.

The Saltillo correspondent of the San Antonio *Express* writes that the locating engineers of the railroad now built to Monclova have finished a survey from that city to Saltillo, and there is a probability that an extension of that road will soon be begun. This would be of importance both to Saltillo and San Antonio. It would make direct competition between the Sunset and International from San Antonio and all eastern points, and so cheapen passenger and freight rates to points in northeastern Mexico. He calculates the whole distance from San Antonio to Saltillo by this route would be less than the Laredo route by 50 to 75 miles, and the time would be about eighteen hours for passenger trains with no stop over to cross the Rio Grande, as the company has an excellent bridge at Eagle Pass.

The Tampico Division of the Mexican Central is now completed from Tampico to a point 160 miles distant from San Luis Potosí. From this point to the plateau the grading is partially done and the work is progressing slowly in spite of the non-receipt of any further funds for construction account from the Boston office. The state government of San Luis Potosí keeps up its subvention, amounting to $5,000 or $6,000 per month. There are large tracts of good agricultural land on this line which, if colonized and cultivated, could be made to be very productive. Almost all this land is held by large landowners who in many cases have not the means to utilize their property. If these lands could be settled by energetic colonists the Tampico Division would not long be dependent on state or federal subventions; its completion would soon become a necessity and it would be more than self-supporting. The projected line from San Luis Potosí to the main line at Aguascalientes does not offer so many difficulties in the way of construction as that part of the division lying east of San Luis. It lies along the table land and passes through a good mining country. When this is completed, the Central can command the transportation of the salt for which the state of San Luis Potosí is well known. At present the salt is shipped in large wagons to the station of Soledad on the main line, when it is destined for remote points, but the large portion that goes to Zacatecas is carried by wagon all the way. With the completion of the Tampico Division wagons could be entirely dispensed with and the salt could be shipped in every direction by rail.

A contract has been signed by Secretary Pacheco and Governor Mier y Teran of Oaxaca for the construction of a railroad to extend from Tehuacan to the city of Oaxaca. The state government of Oaxaca is thereby authorized to build on its own account or to organize one or more companies to build this railroad and to operate it for the term of 99 years. Permission is also given to extend the line from Tehuacan to Puebla or to any other point on the Mexican Railway that may be considered most advisable. Work must be begun within five years and the road must be completed within 12 years. Besides exemption from duties on all material imported for construction and operation, during the time of construction and 15 years after completion, the company is given the right of way over all government lands and is also to receive from the federal government 8 per cent. per annum for 15 years on the capital employed. To secure this subvention the federal government pledges the 25 per cent. of all state revenues now paid by the state of Oaxaca into the federal treasury, and if this is not sufficient, 2 per cent. of the entire customs revenues of the nation and the receipts from the national lottery after the latter are freed from the mortgage on them held by the National Bank. It will therefore be seen that Oaxaca has been very liberally treated in this matter. The passenger tariff is fixed at 4 cents for first-class; 2½ for second and 1½ for third-class. Freight rates are 8 cents first-class; 6 cents second-class, and 4 cents third-class. These rates are all per kilometer. There is no question that this road is needed and that its completion would be of the greatest value to Oaxaca and to the republic. A portion of the route covers the same ground as General Grant's Mexican Southern Railroad, the concession of which has now lapsed. Oaxaca is known to be one of the richest and most prosperous Mexican states, and the isolation which it suffers for lack of communication is its only drawback.

Milwaukee, Lake Shore & Western.—Work is being pushed on the branch of this road from Watersmeet, Mich., northward to Republic. A large force is now employed, and some 5 miles are already graded. At Republic this branch will connect with the Republic Branch of the Marquette, Houghton & Ontonagon road and will complete a new rail line from Marquette to Milwaukee.

Milwaukee & Northern.—The extension of this road from the old terminus at Pike, Wis., to Iron Mountain is being pushed as rapidly as possible, and the grading is now nearly finished. Tracklaying has been begun and the rails are reported down for 4 miles from Pike northward.

Milwaukee & Whitefish Bay.—This company has been incorporated to build a short suburban line, running from Milwaukee to Whitefish Bay. It is proposed to build the line for steam power, using very light equipment and running frequent trains.

Minneapolis, Sault Ste. Marie & Atlantic.—On the extension of this line eastward work has been begun at the crossing of the Wisconsin Central near Rhinelander, Wis. The grading parties are working both east and west from that point.

New York, Lake Erie & Western.—The statement for April and the seven months of the fiscal year from Oct. 1 to April 30 is as follows, the figures including 68 per cent. of the gross earnings and all the working expenses of the leased New York, Pennsylvania & Ohio road:

	April.		Seven months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$1,741,356	$1,469,012	$12,383,727	$10,866,182
Expenses	1,274,423	1,199,999	8,962,802	8,360,556
Net earnings	$466,933	$269,013	$3,420,925	$2,505,626

Here there was for the seven months an increase in gross earnings of $1,517,545, or 14 per cent.; an increase in expense of $502,246, or 7.2 per cent., and an increase in net earnings of $915,299, or 36.5 per cent.

The earnings of the Erie lines proper, excluding all earnings and expenses of the New York, Pennsylvania & Ohio, were as follows:

	April.		Seven months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$1,418,702	$1,201,648	$10,085,554	$8,806,509
Expenses	964,402	905,842	6,684,092	6,280,302
Net earnings	$454,300	$295,806	$3,401,462	$2,526,207

For the seven months the gross earnings increased $1,279,045, or 14.5 per cent., and the expenses $403,790, or 6.4 per cent., leaving a gain in net earnings of $875,255, or 34.6 per cent.

A comparison of the statements shows that for the seven months this year the 68 per cent. of the gross earnings of the leased road amounted to $2,298,173, and its working expenses to $2,278,709, leaving a net balance of $19,464 as profit on the lease, against a loss of $20,582 for the corresponding time last year.

New York & New England.—The statements to the New York Railroad Commission give the following figures for the quarter ending March 31, and the six months from Oct 1 to March 31:

	Quarter.		Half-year.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$853,573	$711,420	$1,804,073	$1,592,405
Expenses	562,963	499,229	1,144,392	1,075,101
Net earnings	$290,610	$212,191	$659,681	$426,504
Other income	32,851	20,244	54,434	39,146
Total income	$323,461	$232,435	$714,115	$465,650
Interest, rentals and taxes	275,686	274,273	730,979	564,190
Surplus or deficit	S. $47,775	D. $41,838	D. $16,864	D. $98,540

The Connecticut Supreme Court is to be asked to pass upon the question of the authority of the directors to pay dividends on the preferred stock in the present condition of the road, financially. Hon. Augustus Brandegee appeared before the Superior Court in New Haven May 28, and raised the question by the usual legal motion. He appeared as counsel for holders of the preferred stock, and was amicably joined by Hon. Simeon E. Baldwin of New Haven, who is the Connecticut Counsel for the road. The Court ordered that the motion be reserved for the decision of the Supreme Court. It has been placed on the docket, so that it will be reached during the next term of the Court, which will be held in New Haven within a few days.

New York, Ontario & Western.—This company has arranged to lease the Utica, Clinton & Binghampton and the Rome & Clinton roads, which have heretofore been operated by the Delaware & Hudson Canal Co. These roads form a line from Randallsville, N. Y., to Utica, 31 miles, with a branch 13 miles long from Clinton, N. Y., to Rome. They were originally built in the interest of the New York & Oswego Midland and were leased to that company, the Delaware & Hudson Canal Co. guaranteeing the lease. When the Midland went into bankruptcy, the Delaware & Hudson Co. was forced to assume the leases and for several years sub-leased the roads to the Delaware, Lackawanna & Western, but some three years ago reassumed the management of the property. They have never been profitable lines, not earning their rentals. It is understood, however, that the Ontario & Western obtains the roads on more favorable terms than they have heretofore been leased. The roads will be of more value to this line than to the former lessees, as they can be made direct feeders to its road, giving it conection with the important towns of Rome and Utica.

Northern (New Hampshire).—In Concord, N. H., June 2, the Supreme Court began the hearing of arguments in the Dow suit to set aside the lease of this road to the Boston & Lowell. Argument is before the full bench, on the legal questions involved, there being no dispute as to the facts.

Northern Pacific.—The statement for April and the ten months of the fiscal year from July 1 to April 30 is as follows:

	April.		Ten months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$993,483	$877,665	$9,669,438	$9,320,542
Expenses	508,739	478,082	4,921,891	5,043,206
Net earnings	$484,744	$399,583	$4,747,547	$4,277,306
Fixed charges			4,970,929	4,445,861
Deficit			$223,382	$168,555

For the ten months the gross earnings increased $348,896, or 3.7 per cent., and the expenses decreased $121,345, or 2.2 per cent., the result being a gain of $470,241, or 10.9 per cent., in net earnings. Fixed charges increased $525,068, or 11.8 per cent., leaving an increase of $54,827, or 32.4 per cent., in the deficit.

Nova Scotia.—The agreement which the government of Nova Scotia has just entered into with the Joint Stock Association of London (England) is summarized by the Toronto *Monetary Times* as follows: "This association agrees to build and equip, within two years from May 6, the 18 miles of the Western Counties road around the south shore of Annapolis Basin, needed to connect Annapolis and Digby. Towards this the Dominion government gives $64,000 by way of subsidy.

"It may be stated here, that the province possesses the right to acquire the Western Counties, the Windsor & Annapolis, and the Windsor Branch, and has running powers over the Intercolonial road from Windsor Junction into Halifax.

"The company which the association forms to do the work in question, has power to issue perpetual debenture stock, interest on which for the space of 20 years is guaranteed by the province. It may pay off the A or B debentures of the Windsor & Annapolis road or exchange them for the debenture stock named, on certain conditions. It is agreed that if the net earnings of the consolidated roads from Halifax to Yarmouth shall in any year amount to less than £20,000, the government of the province shall make up the deficiency.

"The company is to receive, when the 18 miles of road are finished, all the land grants given to the Western Counties road by previous laws and may credit proceeds of sale of such lands to its reserve fund. Out of the monies raised by provincial guarantee under this act, £277,000 are to be retained by the Nova Scotia government on account of subsidies and aid already granted. A sum not exceeding $120,000 is to be paid for the amicable acquisition of the Western Counties road.

"The company is, besides, to create £100,000 of stock not guaranteed, which will go to provide additional capital to purchase rolling stock or provide wharves and stations if required by the increase of traffic.

"The Nova Scotia government shall have a first lien upon the rails, rolling stock and plant which have been provided out of the provincial guarantee, and a right to appoint a director upon the board whose status shall be the same as that of its other members. We observe that none of its directors or officials is permitted to have an interest in any construction contract entered into by the company, nor to supply rolling stock or materials to it. Steel rails are to be used wherever relaying of rails is required."

Ohio & Mississippi.—The statement for April and the four months to April 30 is as follows:

	April.		Four months.	
	1886.	1885.	1886.	1885.
Earnings	$270,198	$288,904	$1,124,566	$1,198,734
Expenses	210,328	221,642	860,856	949,329
Net earnings	$59,870	$67,322	$263,710	$249,405
Per cent. of exps.	77.8	76.7	76.5	79.1

For the four months the gross earnings decreased $74,168, or 6.2 per cent., and the expenses $88,478, or 9.3 per cent., the result being a gain of $14,305, or 5.7 per cent., in net earnings.

The statement for April and the seven months of the fiscal year from Oct. 1 to April 30 is as follows:

	April.		Seven months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$314,504	$262,102	$2,135,248	$1,782,757
Expenses	208,447	189,865	1,349,226	1,263,564
Net earn	$106,057	$72,237	$786,022	$519,193

For the seven months the gross earnings increased $352,491, or 19.8 per cent., and the expenses $85,662, or 6.8 per cent., leaving a gain of $266,829, or 51.4 per cent. in net earnings.

Oregon & Transcontinental Co.—The following official statement of assets and liabilities on May 1 is issued at the office of the company:

Assets May 1, 1886:

	Shares.		Bonds, etc.
Oregon R'w'y & Nav.	139,413	Ore. Improve't notes	$518,000
Northern Pacific, pref.	56,830	Lands, estim'd value	230,000
Northern Pacific, com.	79,251	N. Y. City & North'n 1st m. bonds	39,000
Oregon & Transcont	3,000	Port'd Hotel (unfin.)	150,000
Oregon Improvement	9,268	Puget Sound Shore R. R. (unencum'd)	775,000
Wisconsin Cent., com.	13,514	Cedar River exten'n	335,000
Mil. & Lake Winn, pref.	2,775	Claims agst indiv'ls.	212,000
Mil. & Lake Winn, com.	2,260	Claims agst corp'r's (unadjusted) about	3,000,000
St. Paul & N. Pacific	4,975	Mex. Cent. 7s	112,000
Oregon Iron & Steel (cost $150,000)	1,500	Mex. Cent. 3s	25,000
Oregon & Cal., pref.	150	Ore. & Transcont. 6.	142,000
Oregon & Cal., com.	400		
Central & S. Am. Tel.	1,050		

Liabilities May 1, 1886:

Capital stock (400,000 shares)		$40,000,000
Bills payable	$7,870,000	
Less cash on hand	335,000	
		7,535,000
Audited claims		26,000
Total liabilities		$47,561,000

No mention is made in assets of the railroads owned, nor in liabilities of the mortgage bonds issued at $20,000 per mile, on which bonds the Northern Pacific guarantees traffic sufficient to pay interest.

Pennsylvania.—The new iron bridge over the Schuylkill River at Hamburg, Pa., on the extension of the Schuylkill Valley Division, was completed last week and trains ran over it. The bridge is of iron, 600 ft. long, in 7 spans, and is 28 ft. above the river. The approach of the west side is an iron trestle 1,200 ft. long. Tracklaying will now proceed on the line from Hamburg westward.

Philadelphia & Reading.—The examination before the master in the Robinson suit to foreclose the general mortgage has shown that that suit has the support of the required number of the bondholders, and the Court will allow it to proceed. It is reported that, when a decree of foreclosure is granted, Mr. Gowen will appeal the case to the United States Supreme Court.

The Receivers' statements give the earnings of the railroad for April and the five months of the fiscal year from Dec. 1 to April 30 as follows:

	April.		Five months.	
	1886.	1885.	1886.	1885.
Earnings	$2,177,972	$2,343,973	$11,071,443	$10,220,049
Expenses	1,435,446	1,392 655	6,808,953	6,476,790
Net earnings.	$742,526	$951,318	$4,262,490	$3,743 259

For the five months the gross earnings increased $851,394, or 8.3 per cent., and the expenses $332,163, or 5.1 per cent., leaving an increase in net earnings of $519,231, or 13.9 per cent.

The traffic of the railroad lines is reported as follows:

	April.		Five months.	
	1886.	1885.	1886.	1885.
Tons coal	860,323	1,018,652	4,750,086	4,141,507
Tons merchandise	909,897	691,911	3,965 564	2,967 900
Passengers	2,054,918	1,879,532	9,309,674	8,516,105
Tons coal on colliers	38,876	43,292	200,603	218,436

The month shows a decrease in coal, but an increase in general freight and in passengers; the five months show an increase in all classes of traffic.

The statement for the Philadelphia & Reading Coal & Iron Co. is as follows:

	April.		Five months.	
	1886.	1885.	1886.	1885.
Earnings	$1,093,605	$1 179,969	$5,161,373	$5,123,668
Expenses	1,317,010	1,144,758	5,946,607	5,252,000
Surplus or def.	D $223,405	S.$35 211	D.$785,234	D $129,531

For the five months the gross earnings increased $37,704, or 0.7 per cent., and the expenses $693,407, or 13.2 per cent., the result being an increase in the deficiency of $655,703, or 506.2 per cent.

The coal mined from the company's lands was as follows:

	April.		Five months.	
	1886.	1885.	1886	1885.
By Coal & Iron Co.	355,772	415,551	1,885,579	1,645,478
By tenants	37,541	64 499	246,798	269,854
Total	393,313	480,050	2.132,177	1,915,332

The total decrease for the month was 86,737 tons, or 18.1 per cent.; the increase for the five months, 216,845 tons, or 11.3 per cent.

The joint net earnings of the two companies were:

	April.		Five months.	
	1886.	1885.	1886.	1885.
Railroad Co., net	$742,526	$951,318	$4,262,490	$3,743,259
Coal & Iron Co., def.	223,405	*35,211	785,234	129,531
Total, net	$519,121	$986,529	$3,477,256	$3 613,728

* Net earnings.

Decrease in total net earnings for the month, $467,408, or 47.4 per cent.; for the five months $136,472, or 3.8 per cent. As the expenses reported do not include anything for interest or rentals, the net earnings given above are the sums from which all fixed charges are to be provided.

Pittsboro.—Work has been for some time steadily in progress on this road, and the grading is now nearly all finished. It is to extend from the Raleigh & Augusta Air Line near Moncure, N. C., westward to Pittsboro, about 11 miles. Tracklaying was recently begun, and the rails are reported down for 3 miles from Moncure.

Pittsburgh, Cincinnati & St. Louis.—The Circuit Court at Columbus, O., has made perpetual the temporary injunction heretofore granted to this company to restrain the Baltimore & Ohio Co. from taking up switches and turnouts, or making other alterations, on the tracks owned and occupied jointly by the two companies between Newark, O., and Columbus.

Pittsburgh, Fort Wayne & Chicago.—The system of interlocking switches and signals is to be applied at all important points on the line of this road between Pittsburgh and Chicago. In Allegheny, Pa., there is already completed an extensive system with the necessary signal towers and other apparatus.

Richmond & Danville.—General Manager E. B. Thomas gives notice that on Sunday, July 4 next, this company will put in force the uniform code of hands and lamp, bell-cord, whistle and train signals as adopted by the General Time Convention at Philadelphia, Oct. 9, 1884. A circular containing the signals has been issued, under date of June 1, in order that employés may have sufficient time to familiarize themselves with these signals before the change is made. This circular contains a full description of the different signals, which has already been given in our columns.

Shell Beach.—Grading has been begun on the extension of this road from its present terminus at Shell Beach, La., 39 miles from New Orleans, to Pointe a la Hache, a distance of 24 miles, and work is to be pushed as rapidly as possible.

Silver Springs, Ocala & Gulf.—Work is in progress on the grading of the extension of this road from the present terminus at Cotton Plant, Fla., westward to the Withlacoochee River a distance of about 25 miles.

Southern Change of Gauge.—The work of changing the gauge of the southern railroads from 5 ft. to the standard, for which preparations have been in progress for several months past, was finally completed on Monday and Tuesday of this week. Work was begun last week, when quite a number of the branches and short lines were changed, in order to leave a full force free for the work on the main lines.

On May 31 the change was made on the Louisville & Nashville and its controlled lines; the Nashville, Chattanooga & St. Louis; the Cincinnati, New Orleans and Texas Pacific lines; the western lines of the Central, of Georgia, and on the Florida roads. The other roads were changed on June 1, leaving only a few branch lines to be completed.

It is impossible to give within our limited space any of the number of detailed accounts which have reached us. It can only be said that everywhere the change was promptly made, without mishap or serious delay, and that on all the roads the arrangements previously made were successfully carried out. The magnitude of the work may be understood from the condensed statement given below.

The lines the gauge of which was changed were:

Richmond and Danville and controlled lines	2,670
Wilmington, Columbia & Augusta	195
Northeastern (S. C.)	102
South Carolina Railway	250
Central, of Georgia	900
Georgia Railroad and controlled lines	412
Savannah, Florida & Western and controlled lines	800
Florida Railway & Navigation Co.	540
Louisville & Nashville and controlled lines	2,450
Cincinnati, New Orleans & Texas Pacific and controlled lines	630
Nashville, Chattanooga & St. Louis	575
East Tennessee, Virginia & Georgia	1,164
Memphis & Charleston	292
Western & Atlantic	138
Minor lines, not mentioned, about	450
Total mileage changed, about	11,508

The Illinois Central and the Mobile & Ohio changed their gauge last year, and some of the lines controlled by the Cincinnati, New Orleans & Texas Pacific Co. were changed some months ago. As noted above, some work in the way of changing the short branches and minor connecting lines was done early in the week, but on the two principal days fully 10,000 miles of road must have been changed.

All these lines are now of 4 ft. 9 in. gauge, except those of the Cincinnati, New Orleans & Texas Pacific Co., whose managers did not join in the general agreement and preferred the 4 ft. 8½ in gauge.

South Pennsylvania.—In Harrisburg, June 1, the Pennsylvania Supreme Court began the hearing of arguments on the appeal from the decision of the Dauphin County Court of Common Pleas restraining the Pennsylvania Railroad Co. from purchasing the control of the South Pennsylvania and the Beech Creek, Clearfield & Southwestern roads. A number of counsel are to be heard on both sides, and it was expected that the case would occupy nearly all the week.

Taylor, Elgin & Bastrop.—Work has been begun on the grading of this road between Taylor, Tex., and Elgin. Contracts have been let for part of the grading, and the rest will be let as soon as the location is completed.

Wabash, St. Louis & Pacific.—The Purchasing Committee issues the circular given below, which is addressed to holders of the following divisional bonds:

Toledo & Illinois, Lake Erie, Wabash & St. Louis; Great Western of 1859; Quincy & Toledo; Illinois & South Iowa, and Decatur & East St. Louis, first mortgages; Toledo & Wabash; Wabash & Western, and Great Western of 1859, second mortgages; Chicago Division, first mortgage, Toledo, Wabash & Western consol; Wabash Railway, 7 per cent. of 1879; Hannibal & Naples, first mortgage; Wabash Railway, funded debt bonds and scrip.

"The undersigned, a committee under the bondholders' agreement of July 15, 1885, have purchased the lines of the company, subject to all prior liens.

"A reorganization under this agreement will relieve the property from a fixed charge for interest upon $27,000,000 of junior bonded debt, and from a large amount for rental of unprofitable lines, and will also provide, by contributions from such junior bonds and from sale of the new stock, for the payment of the existing receiver's indebtedness.

"The holders of bonds secured by the senior mortgages are now asked to assent to a reasonable adjustment of their interest claims, necessary to make their own security undoubted, and just to the holders of junior securities and stock who have made the large concessions and cash contributions mentioned.

"The proposal leaves the holders of senior bonds in possession of all their present security, and will enable the reorganized company shortly to resume interest payments on all such bonds and promptly to meet all fixed charges in the future.

"Books for the signatures of the bondholders are now open at the office of the committee, No. 195 Broadway, where also pamphlets can be obtained giving full details of the proposed adjustment and the reasons which make it necessary."

West Jersey.—The statement for April and the four months to April 30 is as follows:

	April		Four months	
	1886.	1885.	1886.	1885.
Earnings	$102,365	$94,208	$325,931	$303,676
Expenses	61,867	56 234	212,893	203,618
Net earnings.	$40,498	$37,974	$113 035	$100,058
Interest, rentals, etc			84,558	71,226
Surplus			$28,477	$27,832

For the four months the gross earnings increased $22,255, or 7.3 per cent., and the expenses $9,278, or 4.5 per cent., leaving an increase in net earnings of $12,977, or 12.9 per cent. The fixed charges increased $12,332, or 17.2 per cent., leaving a gain of $645, or 2.3 per cent., in the surplus.

Wilmington & Northern.—This company has made an agreement under which the coal from the Philadelphia & Reading road bound for Baltimore and Washington will pass over its line. The coal will be received from the Reading at Birdsboro, Pa., and carried by this road to Wilmington, where it will be delivered to the Baltimore & Ohio. It is expected that this business will amount to about 400,000 tons yearly.

ANNUAL REPORTS.

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Chicago, Rock Island & Pacific.

The following statement for the year ending March 31 has been published, in advance of the issue of the full report, which will not be ready for a month yet:

	1885-86	1884-85.	Inc. or. Dec.	P. c.
Gross earnings	$12,004,348	$12,2? 6,911	D. $202.563	1.6
Expenses	7,166,893	7,160,324	I. 6.569	0.1
Net earnings	$4,837,455	$5,046,587	D. $209,132	4.1
Interest, rentals and dividends	4,617,215	4,429,402	I. 187,813	4.2
Surplus	$220,240	$617,185	D. $396,945	64 3

This statement does not include the receipts from land sales, which were $330,000 in 1884-85. In that year there was a surplus (including land receipts) of $847,185, from which the sum of $750,000 was carried to improvement account. Dividends paid were 7 per cent. in each year.

Stewartstown.

This company last year built a railroad 7 miles long from a junction with the Northern Central road through a hilly but rich farming country to Stewartstown, Pa. The first report of the President, Mr. James Fulton, covers a period of 6½ months, from the opening of the road in September, 1885, to March 31, 1886. It is of interest as showing the operations of a road built by farmers and depending solely upon an agricultural community for support.

The general statement is as follows:

Cost of road and equipment		$71,621
Interest on loans and accounts		683
Total		$72,304
Cash from stock subscriptions	$46,000	
From individuals for switches	440	
Net earnings of road	2,394	
		48,834
Balance of debt outstanding		$23,470

The stock subscriptions collected since April 1 and still collectible amount to $2,470, leaving a balance of $21,000, which is to be raised by an additional issue of stock to be taken at par and paid up by Oct. 1 next.

The cost of the road was as follows: Surveys, right of way, grading, masonry and buildings, $25,745; bridges and trestles, $9,249; rails, fastenings and tracklaying, $29,370; equipment, $7,257; total, $71,621, or $10,232 per mile. This represents a solidly built road, laid with 50-lb. steel rails and two-thirds ballasted with stone; the equipment including one 30-ton locomotive, 1 combination baggage and passenger car, 1 stone car and 1 hand car. Freight cars are furnished by the Northern Central.

For the 6½ months the earnings were as follows:

Earnings ($868 per mile)	$6,074
Expenses (60.3 per cent.)	3,680
Net earnings ($342 per mile)	$2,394

The net earnings were 3.3 per cent. on the cost of the road, or at the rate of about 6 per cent. a year.

The road carried 9,586 passengers and 6,974 tons of freight. Of the freight tonnage 2,317 tons were grain, potatoes, tobacco, live stock and other farm products and 1,414 tons lumber; the return freight including 1,135 tons of merchandise, 664 tons coal and 1,444 tons of fertilizers.

A branch of the road to Shrewsbury is proposed, which will require a switch-back or similar arrangement to avoid excessive grades.

Canadian Pacific.

The property owned and operated by this company at the close of the last fiscal year, Dec. 31, 1885, was as follows:

	Miles.
Main Line:	
Montreal to Savona's Ferry	2,679.0
Savona's Ferry to Pt. Moody (built by government)	213.0
Pt. Moody to Vancouver (under construction)	14.0
Total Main Line	2,906.0
Eastern Division, Quebec to St. Martin's Junction	159.1
Branches	241.6
	400.7
Western Division, branch lines in Manitoba	392.7
Pacific Division, New Westminster Branch	9
Leased lines, Smith's Falls to Toronto, St. Thomas, Owen Sound, etc	6
Total mileage	

A considerable part of this mileage was not in operation was under construction during the year.

The equipment includes 336 locomotives; 31 sleeper 289 passenger and baggage cars; 7,838 freight cars

caboose cars: 25 official and business cars and 48 service cars.

The general account is as follows, condensed:

Liabilities:

Capital stock	$65,000,000
First-mortgage bonds	14,600,000
Mortgage bonds on acquired lines	5,323,333
Land grant bonds (not including $13,996,000 held by government)	3,612,500
Dominion government 4 per cent. loan	19,150 700
" " loan secured by lands	9,880,912
Unpaid vouchers and accounts	2,101,776
Cash subsidy paid by government	24,539,913
Land grant, net proceeds of sales	8,971,209
Town site sales (not covered by land grant mortgage)	505,626
Bonuses received from municipalities	232,600
Net revenue, less fixed charges	3,781,722
Total liabilities	$157,700,291

Assets:

Cost of road	$120,655,064
Cost of equipment	9,344,297
Construction plants and tools	130 812
Real estate in and near Montreal	414,582
Advances to leased lines	3 313,907
Accounts receivable	2,139,137
Materials and supplies on hand	1,586,707
Dominion government guarantee fund	13.238 264
Balance due on lands sold	1.579,709
Cash on deposit at interest	2 287.333
Cash on hand	3,010,479
Total assets	$157.700,291

The amount of first-mortgage bonds given does not include $19,150,700 deposited with the government as security.

The cost of road is made up as follows: Main line, $107,-251,469; acquired lines, $8,436,341; branch lines, $4,967,-254; total, $120,655,064. This does not include the lines built by the government, the estimated cost of which is $35,000,000.

The total land grant was 25,000,000 acres, of which 3,472,-018 acres have been sold and 6,793,315 will be returned to the government under the agreement noted below, leaving 14,734,667 acres on hand. The issue of land grant bonds was $25,000,000, of which $7,391,500 have been canceled from land sales and $13,996,000 are held by the government (to be canceled under the new agreement), leaving $3,612,500 outstanding.

It is estimated that on July 1 next the fixed capital liabilities will be $65,000,000 stock and $61,884,013 debt, including leased line liabilities. The annual fixed charges, interest and rentals, will be $3,110,434. This capitalization will represent 4,338 miles of railroad; 14,734,000 acres of land and $12,263,264 deposited with the government to secure the guaranteed dividend of 3 per cent. on the stock.

The passengers and freight carried were as follows:

	Number.	Rate per mile.
Passengers	1,660.719	2.45 cents.
Tons freight carried	1,996,355	1.20 "

Detailed statistics cannot be given, owing to the burning of the offices at Winnipeg, when most of the traffic records were destroyed.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight	$4.881,866	$3,410,365	I. $1.471.501	43.2
Passengers	2,859,223	1,980,902	I. 878 321	44.3
Sleeping cars	73,523	43,493	I. 30,030	69.0
Mail and express	309.455	181,409	I. 128,046	70.6
Miscellaneous	244,426	134.352	I. 110,074	81.9
Total	$8,368,493	$5.750,521	I $2,617,972	45 5
Expenses	5,143 276	4,558,630	I 584,646	12 8
Net earnings	$3,225,217	$1,191,891	I. $2,033 326	170.6
Gross earn. per mile	2 816	2.388	I. 458	19.2
Net " "	1,095	495	I. 600	121 2
Per cent. of exps	61.5	79.3	D. 17.8	....

The construction material carried, which is included in the earnings above and charged at actual cost, amounted to $716,418 gross last year, and $623,193 in 1884.

No statement of the disposition made of net earnings appears in the report.

Grain elevators were built during the year at Montreal, Port Arthur, Fort William and Owen Sound, and other arrangements made for improvement of facilities for handling freight.

During the year the North Shore road, from Montreal to Quebec, was acquired on terms which will make it cost the company about $200,000 yearly.

The development of coal mining in the Northwest promises to make the transportation of coal an important item of business. Extensive beds of coal have been discovered, and will be work d at a number of points.

Work in progress includes the extension of the leased Ontario & Quebec line from Smith's Falls to Montreal and the bridge over the St. Lawrence River, which are to be finished this year. The extension of the Algoma Branch to the Sault Ste. Marie and several shorter branches are in progress. On the western end the main line is to be extended from Port Moody to Vancouver, owing to the poor facilities afforded by the harbor and surroundings at Port Moody.

Extensive docks and warehouses are to be built at Vancouver, and arrangements are in progress for the running of steamships from that port to Japan, China and Australia. Arrangements have also been made for a steamship line to San Francisco, and for other water connections.

Independent connecting lines completed include extensions of the Manitoba Southwestern road, and the completion of a line 110 miles long from Dunmore, Man., to the coal mines at Lethbridge. The Northern Railroad has completed its line from Toronto to a connection with this road at Thorncliff, near Lake Nipissing.

Concerning the late financial agreement with the Canadian government, the report says: "Under the legislation of the last session the company's debt to the government, amounting to $29,880,912, was divided into two parts, and the time of its repayment postponed until 1891. To secure the repayment of the first part, amounting to $20,000,000, the government agreed to take $20,000,000 of the newly authorized 5 per cent. first mortgage bonds. To secure the repayment of the balance, amounting to $9,880,912, the government took a lien on the whole of the company's land grant, with the provision that the interest on this part of the debt should be paid out of the proceeds of land sales and, failing the sufficiency of the income from that source to meet the annual interest, that it should ultimately become the first charge on the net revenues of the company after the payment of interest on the bonds and rentals of leased lines, and consequently no dividend from net earnings could be paid to the shareholders while any arrears of interest due to the government should remain unpaid. In view of the practical completion of the contract with the government for the construction of the railway, and of the necessity for restoring to the company the free control of its resources, and for the purpose of providing for a final ment of all matters between the government and the y, a new agreement was made with the government h 30 last, which in effect provides that the company y July 1 next, repay to the government, in cash, the amount of that portion of the red by the pledge of the $20,000,000 first- bonds, and that the government shall then accept in full satisfaction of its claim for the balance of the debt, amounting to $9,880,912, with interest, lands sufficient to cover the amount at the rate of $1.50 per acre. In pursuance of this agreement, the unsold balance of the 5 per cent first-mortgage bonds authorized by the act of last year, amounting to £4,191,500, was recently placed on the London market by Messrs. Baring Bro. & Co. at the price of 104. From the proceeds of this issue the company was able, on May 1, to make a payment to the government of over £2,000,000 on account, and on July 1 next the remainder of the debt due to the government will be paid. The company will then have discharged all its obligations to the government and will have honorably paid back in full the money loaned to it, five years before it was due."

Pittsburgh, Cincinnati & St. Louis.

For the year 1885 this company worked the following lines, no change from the previous year being noted:

	Miles.
P., C. & St. L., Main Line, Pittsburgh to Columbus	192.8
Cadiz Branch	8.1
Total P., C. & St. L	200.9
Chartiers R. R	22.8
Pittsburgh, Wheeling & Kentucky	28.4
Cincinnati & Muskingum Valley	148.4
Little Miami R. R	195.9
Total	596.4

The road owned is the main line from Pittsburgh to Newark, O., 159.8 miles, the Cadiz Branch, and one-half interest in the 33 miles from Newark to Columbus, the other half being held by the Baltimore & Ohio as lessee of the Central Ohio.

These lines are the southern group or system of the Pennsylvania lines west of Pittsburgh.

The company also owns one-half share in the St. Louis, Vandalia & Terre Haute road, from Terre Haute to East St. Louis. This road is leased and worked by the Terre Haute & Indianapolis Co., the joint owner.

The equipment in use on these lines is as follows:

	P., C. & St. L.	Cin. & M. Vy.	Little Miami.
Locomotives	121	12	44
Passenger cars	56	9	47
Baggage, mail and express	32	"	14
Freight cars	4,590	359	706
Service cars	4	1	3

The Chartiers and the Pittsburgh, Wheeling & Kentucky have no separate equipment.

The general account is at follows, condensed:

Stock, common	$2 508,000
" preferred	2 929,200
" second preferred	3,000,000
Funded debt	12,617.000
Deferred liabilities	1 146,344
Current liabilities	2,013,725
Total	$24 214,269
Road and equipment	$20,870,740
Deferred assets	454,635
Betterments to leased roads	38.170
Securities owned	1,312,525
Current assets, cash, etc	1,100,717
Profit and loss, debit balance	428,482
	24,214,269

The funded debt includes $134,000 Columbus & Newark Division; $120,000 Holliday's Cove; $3,000,000 Steubenville & Indiana firsts; $2,500,000 seconds and $6,863,000 first consols. There was no change in amount, but $61,000 consols were converted from coupon into registered bonds. There were 23 shares of stock issued in exchange for old Steubenville & Indiana stock and scrip.

The earnings of the Pittsburgh, Cincinnati & St. Louis, 200.9 miles, were as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Freight	$2.793,620	$2,706,212	I. $87,408	3 2
Passengers	9'3,?09	1.019,875	D. 106.576	10.4
Mail and express	308,051	294 368	I. 13.683	4.7
Other	18 653	24,803	D. 6,150	24.8
Total	$4,031,623	$4.045,258	D. $11,675	0.3
Expenses	2,681,833	2,731,960	D. 5',327	1 8
Net earnings	$1,351,990	$1,313,298	I. $38,692	3.0
Gross earn. per mile	20,078	20,136	D. 58	0.3
Net " "	6.730	6,537	I. 193	3 0
Per cent. of expenses	66.5	67.5	D. 1.0	....

There were 1,313 tons of steel rails and 100,415 new ties used in renewals and improvements; 4.27 miles of new sidings were laid and much ballasting done. Betterments amounted to $72,463, including $936 for work on Gould tunnel and $71,527 for new freight cars.

The result of the year was as follows:

Net earnings, as above		$1,351,990
Interest, etc, received		5,424
Total		$1,357,414
Interest on bonds	$646.990	
" car trusts	99,171	
Rent of Monongahela extension	51,147	
Interest on Little Miami securities	79,444	
		876,752
Net result on P., C. & St. L		$480,662
One-half profit on St. L., Vandalia & Terre Haute		22,573
Total		$503,235
Loss on Little Miami lease	$423.976	
Advances, Cin. & Mus. Vall'y	119,417	
		543,393
Net loss for the year		$40,158

This net loss compares with a similar loss of $147,210 in 1884, showing a reduction of $107,052 last year.

The St. Louis, Vandalia & Terre Haute road is leased to the Terre Haute & Indianapolis Co. This company, as joint owner, receives half the profit or bears half the loss, as the case may be.

TRAFFIC.

The traffic moved on all the lines was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passengers carried	2,991 930	3,257 657	D. 265.727	8.2
Passenger-miles	75,269,852	78,343.949	D. 3,074 097	3.9
Tons freight carried	6.144.873	5,649.974	I. 494,899	8.8
Ton-miles	633,145,044	534,568,333	I. 98,576,711	18 4

There was thus a decrease in passenger traffic, but a very considerable increase in freight traffic.

The above statement does not include the St Louis, Vandalia & Terre Haute, which is not operated directly by this company, although a statement for it is given in the report.

The traffic of the several lines, with the percentage of increase or decrease, as compared with 1884, was as follows:

	Passenger-miles.		Ton-miles.	
P., C. & St. L	41,343,364	I. 3.2	523,347,364	I. 21.1
Chartiers	2,369,167	D. 12.0	2,197,386	D. 0.9
Pitts., Wh. & Ky.	1,659,309	D. 27 9	6,441,222	I. 49.2
Cin. & Mus. Vy.	4,281,479	D. 26.0	14.299.443	I. 10.5
Little Miami	25,776,533	D. 6 9	86,859,629	I. 4.6
Total	75,269,852	D. 3.9	633,145,044	I. 18.4

In passenger traffic all the lines but the main line show decreases. In freight traffic all the lines show increases except the Chartiers, which is a local coal road.

The earnings and expenses per unit of traffic on all the lines were, in cents:

	Per pass.-mile.			Per ton-mile.		
	Receipt.	Cost.	Net.	Receipt.	Cost.	Net.
P., C. & St. L	2.21	1.70	0.51	0.53	0.38	0.15
1884	2.52	1.99	0.53	0 63	0.45	0.18
Chartiers	3.14	2.03	1.11	2.67	2.13	0.54
1884	3.03	2.30	0.73	3.58	1.98	1.60
Pitts., Wh. & Ky.	2.74	2.30	0.44	1.20	0.79	0.41
1884	2.56	1.90	0.66	1.53	1.30	0.23
Cin. & Mus. Vy.	2.64	4.18	*1.54	1.26	1.45	*0 19
1884	2.62	3.35	*0.73	1.58	1.79	*0.21
Little Miami	2 09	2.06	0.03	0.84	0.91	*0.07
1884	2.32	1.94	0.38	0.95	0 99	*0.04

* Loss.

There was an actual loss on passenger traffic on one of the lines, and on two of them a loss on freight also.

GENERAL REMARKS.

The report says: "It will be noted that there was a large increase in the tonnage in your lines for the past year; this was accompanied, however, by a still further reduction in rates, averaging on your main lines about one mill per ton-mile, so that, while they were called upon to do a largely increased service, the gross and net revenue therefrom were materially reduced, and in the case of the Little Miami road the traffic was carried at an absolute loss. The extraordinarily low rates prevailing throughout the year clearly appear from the tables, from which it will be seen that on your main line the average revenue per ton per mile was but a fraction over 5 mills, with a corresponding decrease upon the other roads embraced in your system.

"There was a heavy reduction in the passenger traffic over your entire system. There was a general reduction also in the rates on this traffic, and a reduced profit therefrom upon nearly all your roads.

"The depressed condition of the country is clearly reflected, both in the reduced volume of passenger travel and the decreased consumption of general merchandise.

"The suit instituted many years since by George M. Chapman, affecting the title to that portion of your road located in West Virginia, was compromised toward the close of the year, and this vexatious litigation finally settled.

"On Jan. 1, 1886, your company surrendered possession of the Cincinnati & Muskingum Valley Railway, in obedience to a decree of the Court of Common Pleas of Jefferson County, O., rendered November, 1885, in the suit of Samuel Jeanes and others against your company and the Cincinnati & Muskingum Valley Co. This suit was brought in June, 1885, by the parties named as stockholders of your company, upon the ground that the lease was a fraud upon the rights of the minority shareholders; and that the lessor had not only failed to observe the covenant in the lease under which it was to provide for betterments for the road, but that it was now, and probably always would be, wholly unable to fulfill its covenant in this particular, or to reimburse your company for advances made, over and above the net earnings, to the Muskingum Valley Co., to enable it to provide for betterments, and to meet the interest on its bonds. These advances now amount to $1,081,013. Leave was granted to Evan J. Henry, a stockholder in the Cincinnati & Muskingum Valley Co., on his own application, to intervene in the suit referred to, and an appeal was taken by him from the decree to the District Court, in which no decision has yet been reached.

"During the year 1885, 23 shares of the common stock of your company were issued, 9 of which were in exchange for 19 shares of the old common stock of the Steubenville & Indiana Railroad Co., and 14 for a like number of Steubenville & Indiana reorganized.

"There was an increase of $61,000 in the issue of first-consolidated mortgage registered bonds in exchange for a like amount of coupon bonds retired, making a total of $4,200,-000 of registered bonds issued at the close of 1885."

The results on the several leased lines were as follows:

CHARTIERS.

The result for this road, 22.8 miles, was as follows:

	1885	1884.	Inc or Dec.	P c.
Earnings	$137.234	$164,080	D. $26,846	16.4
Expenses	91,678	95,090	D. 3,412	3 6
Net earnings	$45,556	$68,990	D. $23,434	38.9
Hire of equipment	8.275	8,730	D. 455	5.2
Balance, rental	$37 281	$60,260	D. $22,979	38.3
Gross earn. per mile	6,019	7,196	D. 1,177	16.4
Net " "	1.998	3,026	D. 1,028	34.1
Per cent. of exps	66.8	57.9	I 8.9	....

The decrease on this line was due chiefly to loss of coal traffic on account of the increasing use of natural gas in Pittsburgh. The net balance is paid as rental for the road.

PITTSBURGH, WHEELING & KENTUCKY.

The operations of this line, 28.4 miles, were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings	$128,024	$130,295	D. $2,271	1.7
Expenses	88,733	100,044	D. 11 311	11.3
Net earnings	$39.291	$30,251	I. $9,040	30.1
Hire of equipment	12,157	10,789	I. 1,368	12 8
Balance, rental	$27,134	$19,462	I. $7,672	39.5
Gross earn. per mile	4,598	4,035	D. 427	5.3
Net " "	1.384	1,146	I 238	20.7
Per cent. of exps	69.3	76.8	D. 7.5	....

The net balance is paid to the company as rental. The expenditure for betterments was $22,402; total due on this account at the close of the year, $25,373.

CINCINNATI & MUSKINGUM VALLEY.

The earnings of this road, 148.4 miles, were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings	$319 645	$383,667	D. $64,022	16.6
Expenses	386,562	425,669	D. 39,107	9.2
Deficit	$66,917	$42,002	I. $24,915	59.3
Interest advanced	52,500	105,000	D. 52,500	50.0
Total deficit	$119,417	$147,002	D. $27,585	18.8
Gross earn. per mile	2.154	2,585	D. 434	16 6
Per cent. of exps	120.9	110.9	I. 10.0	....

Interest paid for this road is an advance, for the repayment of which the lessee has a claim. The lease was abandoned and the road surrendered Dec. 31, 1885, as noted above.

LITTLE MIAMI.

The operations of this line, 195.9 miles, were as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Earnings	$1,447,130	$1,569,899	D. $122,769	7.8
Expenses	1,323,168	1,363,785	D. 40,617	3.0
Net earnings	$123,962	$206,114	D. $82,152	39 9
Interest, etc	167,381	137,696	I. 29,685	21.5
Total	$291,343	$343,810	D. $52,467	15 3
Rental	715,319	719,053	D. 3,734	0.5
Loss	$423,976	$375,243	I. $48,733	13.0
Gross earn. per mile	7,387	8,014	D. 627	7.8
Net " "	633	1.052	D. 419	39.9
Per cent. of exps	91 4	86 9	I. 4.5	....

There were 816 tons of steel rails and 104,191 new ties used in renewals; 1.39 miles of new sidings were laid. This line has become unprofitable owing to increased competition and low rates on traffic.